NAOSITE: Nagasaki University's Academic Output SITE

Title	Studies on the Chironomid Midges Collected on Yakushima Island, Southwestern Japan
Author(s)	Sasa, Manabu; Suzuki, Hiroshi
Citation	熱帯医学 Tropical medicine 42(2). p53-134, 2000
Issue Date	2000-09-30
URL	http://hdl.handle.net/10069/4790
Right	

This document is downloaded at: 2012-10-12T15:15:08Z

http://naosite.lb.nagasaki-u.ac.jp

Trop. Med., 42 (2), 53－134, June, 2000

Studies on the Chironomid Midges Collected on Yakushima Island, Southwestern Japan

Manabu SASA[1] and Hiroshi SUZUKI[2]

[1]*Kankyo Fukushi Kenkyusho, Aramata, 938-0001, Kurobe-shi, Toyama-ken*
[2]*Institute of Tropical Medicine, Nagasaki University, Nagasaki, 852－8523*

Abstract: Collections of adult chironomids were carried out on Yakushima, a high mountainous island south of Kyushu, for six days in March 1999, with insect net during daytime and the side of streams and pools, and with light traps during night time in the towns of Miyanoura and Anbou. The specimens collected were preserved in 70% alcohol, brought to the laboratory in Nagasaki University, screened under a stereomicroscope and a part of them, a total of 402 males were individually mounted on slides in gum-chloral solution. They were mailed to Sasa's laboratory and were classified into species under a compound microscope. As the reults, they were separated into a total of 79 species, including 43 new species, among which 24 (including 10 new species) were identified as belonging to the subfamiy Chironominae, 52 (including 33 new species) to the subfamily Orthocladiinae, and 3 to the subfamily Tanypodinae, and are described in this paper.

Key words: Chironomidae, Taxonomy, New species, Yakushima Island

INTRODUCTION

Yakushima is a circular island located about 70km south of Sata-misaki, the southmost point of Kyushu, and has an area of 538.62 squeare km, and a population of about 13,000. It is a mountainous island, the highest point is 1,935m high from sea leval at the top of Mount Miyanoura, and there are some 45 mountains with the height of more than 1,000m on this small island. It is largely covered by cedar forest, and there are many small rivers and streams assumed to be adequate for the breeding of some chironomid species.

Collections of the chironomid midges on this island were conducted by Suzuki during the period from March 23 to 28, in daytime by sweeping with insect net at 10 localities, mostly at the side of small rivers and streams, and 3 times during night time by operating two light traps at the town of Miyanoura and Annbou. Due to the strong wind and rainfall, collections could not be made at the localities with the height of more than 1,000m.

The adult chironomids collected were prpeserved in 70% ethanol in glass vials, broat to the laboratory in Nagasaki, and were dissected and mounted individually on slide glasses following the method developed by Suzuki. A total of 402 adult males were mounted individually on slides, and were sent to Sasa for identification and description. The results of

Received for publication, May 18, 2000
Contribution No. 4021 from the Institute of Tropical Medicine, Nagasaki University

classification and morphological studies are as shown in the following section.

Materials and Methods

The adult chironomids were collected mainly by the two methods, sweeping during the daytime with insect net of those swarming in air or resting in bushes, and with two light traps operated during night time in outdoor of the hotels. They were collected in sucking tubes, transferred to 70% ethanol media, and brought to the laboratory in Nagasaki. They were then screened under stereomicroscope for different species, and a part of them were individually mounted on slides roughly following the method described in the monograph of Japanese Chironomidae compiled by Sasa and Kikuchi (1995). Both wings were removed with fine forceps by leaving squama as attached to the body and were mounted dry under a 8×24mm slide glass. The body portion was digested in hot 10% KOH solution for about 15 minutes (longer in large spepcimens), washed in water, and dissected on a slide in gum-chloral medium with fine needles under a stereomicroscope, and antennae, head, legs (for legs are attached to antepronotum), thorax and abdomen were each separated with fine needles each at a fixed position by methods developed by Suzuki. The dissected specimens were kept overnight in the drop of mounting medium until they were fixed at the right positions, and a cover glass was placed after additional drop of gum-chloral medium was added. The mounted specimens were placed in slide boxes, and were sent to Sasa by postage. The slides were examined under a compound microscope, and the species name was recorded for each slide together with necessary data, including date and place of collection, and the slide number.

Notes on the chironomid species collected from Yakushima Island

Abbreviations. LT: collected with light trap. SWP: collected by sweeping with insect net.

1. *Chironomus okinawanus* Hasegawa et Sasa, 1987

A male, No.382:81, LT at the town of Miyanoura on March 24. This species has so far been collected only on Okinawa and Amami, the Nansei Islands, and this is the first time that this species was collected north of Amami Island.

2. *Chironomus yoshimatsui* Martin et Sublette, 1972

Seven males were collected; No.381:42, SWP at Nagata, on March 23; No.382:35, SWP at Miyanoura on March 23; No.382:80, LT at Miyanoura on March 24; No.383:63, SWP at Anbou River on March 26; No.383:79, SWP at Shirotani River on March 27; No.384:56, SWP at Anbou; No.384:59, SWP at Shirotani River on March 28. This is a species widely breeding in rather polluted streams all over Japan.

3. *Dicrotendipes nervosus* (Staeger, 1839)

Six males were collected; No. 381:78, SWP at Issogawa River on March 24; NO.

382-82-86, LT at Miyanoura on March 24. This is a species originally recorded from Europe ,and were collected at least at 4 localities in Japan (Sasa & Kikuchi, 1985, p.28).

4. *Paracladopelma kuramaclara* Sasa, 1989 (Figs. 1 a-k)

A male, No.381:09, SWP at the side of a mountains stream Takenogawa on March 23. BL 2.71mm, WL 1.52mm, WW/WL 0.32. Body and legs almost entirely yellow, scutal stripes and postnotum slightly brownish. Head in Fig. 1 a. Eyes bare, ER 0.17. Antenna with 11 flagellar segments, AR 1.06, AHR 0.57. P/H 1.29. SO 10:9, CL 19. Frontal tubercles (Fig. 1 b) about as long as wide. Antepronotum (Fig. 1 c) very widely separated, with 2:2 lateral setae. Scutum and scutellum in Fig. 1 d; DM 10, DL 9:9, PA 4:4, SC 7.

Wing (Fig. 1 e) bare, SQ 8:8, RR 0.27, VR 1.29 (relatively high), R/Cu 1.12. Tip of fore tibia (Fig. 1 f) with a relatively narrow and apically pointed terminal scale. Tips of mid and hind tibiae (Figs. 1 g,h) with two comb scales, both with a spur. fLR 2.09 (relatively high), mLR 0.55, hLR 0.70, fTR 0.32, fBR 2.6, mBR 3.2, hBR 3.4. All legs with large pulvilli.

Hypopygium in Fig. 1 i. Anal point bare, long, narrow and parallel-sided. Dorsal and ventral appendages (Figs. 1 j, dorsal; k, ventral view) both small, the former quadrangeular, with 2 short setae and microtrichia on distal portion, the latter rounded and entirely clothed with microtrichia. Gonostylus nearly parallel-sided and apically rounded.

Remarks. From the above morphological characters and measurement data, this specimen is considerd as belonging to the same spacies as *Paracladopelma kuramaklara* Sasa, 1989, which was recorded only once from the side of Kurama River, Kyoto. It is a remarkable fact that the second specimen unable to differentiate from it is recorded from Yaku Island, south of Kyushu.

5. *Microtendipes amamihosoides* Sasa, 1990 (Figs. 2 a-p)

Four males, No.382:49-52, SWP at Miyanoura River on March 24. BL 5.20-5.70 (5.56 in average of 4) mm, WL 2.64-2.72 (2.68) mm, WW/WL 0.26-0.28 (0.27). Lateral stripes of scutum, and postnotum dark brown, other scutal portions, scutellum and legs brownish yellow, abdominal tergites yellow. Head in Fig. 2 a. ER 0.16-0.29 (0.25), AR 1.77-1.93 (1.84), AHR 0.55-0.69 (0.65), P/H 1.54-1.95 (1.71). SO 20-24 (22.9), CL 32-42 (35.0). Frontal tubercles (Fig. 2 b, No. 382:52) very long, narrow and apically pointed. Antepronotum (Fig. 2 c). tapering towards middle and separated without groove, PN 3-5 (4.0). DM 8-10 (9.5), DL 12-19 (15.5), PA 3-5 (4.0), SC 22-28 (24.3).

Wing (Fig. 2 d) bare, SQ 16-32 (24.0), R2+3 in contact with R1, VR 1.10-1,13 (1.12), R/Cu 1.13-1.27 (1.18). Tip of fore tibia (Fig. 2 e) with a short and rounded terminal process, tips of mid and hind tibiae (Figs. 2 f,g) with two comb scales, one with a spur and the other without spur. fLR 1.23-1.34 (1.31), mLR 0.68-0.73 (0.70), hLR all 0.78, fTR fTR 0.23-0.24, fBR 2.0-2.7 (2.5), mBR 4.0-6.1 (4.6), hBR 4.2-5.1 (4.6).

Hypopygium in Fig. 2 h. Anal point (also in Fig. 2 i) long, bare, slightly tapering. Dorsal appendages narrow and sickle-shaped, with 1 basal and 4 or 5 dorsal setae (Figs. 2 m,n, No.382:49) or 2 basal and 7 or 8 dorsal setae (Figs. 2 j,k, No.382:52). Ventral appendage

(Fig. 2 p) finger-like, with 15 recurved setae. Gonostylus widest at about basal 1/3.

Remarks. This species was originally recorded from Amami Island, and this is the second record. It is especially characteristic in the structure of dorsal appnedages, being sickle-shaped, and with several dorsal and 1 or 2 basal setae.

6. *Pentapedilum yakuabeum* sp. nov. (Figs. 3 a-n)

Eleven males, No.381:81, SWP at Issogawa on March 24, No.382:41, SWP in the town of Miyanoura on March 23, No.384:92-100, LT in the town of Miyanoura on March 28. Holotype: No.384:99. Paratypes: other 10 males. BL 3.64-4.50 (4.24 in average of 11) mm, WL 1.59-2.18 (2.03) mm, WW/WL 0.28-0.31 (0.30). Head in Fig. 3 a. Eyes bare, both with a long dorsomedial extension, ER 0.10-0.29 (0.21). Antenna with 13 flagellar segments, AR 0.95-1.16 (1.07), AHR 0.49-0.55 (0.51). P/H 0.88-1.18 (1.02). SO 9-13 (11.6), CL 8-17 (13.0). Frontal tubercles absent. Antepronotum (Fig. 3 b) separated, without seta. DM 15-23 (18.0), DL 12-20 (16.2), PA 5-8 (6.7), SC 10-24 (17.0), as in Fig. 3 c.

Wing (Fig. 3 d) with rather small numbers of macrotrichia on only the distal portion. R2+3 in contact with R1 in the distal portion. VR 1.24-1.36 (1.33), R/Cu 10.9-1.31 (1.11). Tip of fore tibia (Fig. 3 e) with a rounded terminal scale. Tips of mid and hind tibiae (Figs. 3 f,g) with two comb scales, one with a long spur, the other without spur. fLR 1.19-1.33 (1.28), mLR 0.57-0.63 (0.60), hLR 0.73-0.81 (0.77), fTR 0.23-0.25 (0.24), fBR 2.2-4.8 (3.4), mBR 2.9-5.8 (4.0), hBR 3.6-6.4 (5.0). All legs with large pulvilli (Fig. 3 h, hind tarsus V).

Hypopygium in Fig. 3 i. Anal point (also in Fig. 3 j) long, bare, parallel-sided and apically rounded. Dorsal appendages (also in Fig.s 3 k,m) expanded at the tip and somewhat inverted T-shaped, with 3 basal inner setae and one lateral seta. Ventral appendage (Fig. 3 n) finger-like but with a prominent tubercle at the tip, with 14 recurved setae and one long caudally directed apical seta. Gonostylus widest at about basal 1/3 and apically pointed.

Remarks. This species has basic structures typical as a member of genus *Pentapedilum* Kieffer, 1913, and belongs to the group with rather small numbers of macrotrichia on the wing. However, it is quite unusual as a member of this genus in the shape of dorsal appendage being somewhat inverted T-shaed, and in having a prominent tubercle at the tip of ventral appendage, both not seen in the previously recorded species of this group.

7. *Pentapedilum uncinatum* Goetghebuer, 1921 (Figs. 4 a-d)

Six males, No.381:60, SWP at Nagata on March 23, No.382:63, SWP at Miyanoura River on March 24, No.384:32-35, SWP at Shirotani River on March 27. BL 2.84-3.26 (3.02 in average of 6) mm, WL 1.36-1.72 (1.59) mm, WW/WL 0.29-0.32 (0.31). ER 0.28-0.30 (0.25), AR 1.28-1.54 (1.38), AHR 0.35-0.53 (0.46), P/H 0.98-1.10 (1.03), SO 8-12 (10.3), CL 17-26 (18.2), PN all 0, DM 14-26 (15.8), PA 4-6 (5.1), SC 8-13 (10.5). Wing with macrotrichia on entirel surface, SQ 5-10 (6.8), RR 0.31-0.40 (0.37), VR 1.14-1.26 (1.17), R/Cu 1.12-1.17 (1.14). fLR 1.67-2.00 (1.89), mLR 0.62-0.67 (0.64), hLR 0.72-0.73 (0.73), fTR 0.27-0.34 (0.30), fBR 3.4-4.7 (4.0), mBR 4.8-7.2 (5.7), hBR 5.7-10.3 (7.7). This species was already recorded from 3 localities in Japan (Sasa & Kikuchi, 1995).

8. *Polypedilum (Polypedilum) yakubeceum* sp. nov. (Figs. 5 a-m)

A male, holotype, No.382:62, SWP at Miyanoura River on March 24. BL 3.42mm, WL 1.68mm, WW/WL 0.31. Scutal stripes and postnotum brown, scutellum, legs and abdomen brownish yellow. Head in Fig. 5 a. Eyes bare, ER 0.15. Antenna with 13 flagellar segments, AR 0.59 (very small), AHR 0.36. P/H 1.25. SO 13:12, CL 17. Antepronotum (Fig. 5 b) widely sepaprated, without setae. DM 18, DL 19:16, PA 5:5, SC 14, as in Fig. 5 c.

Wing (Fig. 5 d) bare, squama with 8 fringe hairs, R2+3 in contact with R1, VR 1.32, R/Cu 1.18. Tip of fore tibia (Fig. 5 e) with a long, narrow and pointed terminal scale, tips of mid and hind tibiae (Figs. 5 f,g) with two comb scales, one with a long spur, the other without spur. fLR 1.77, mLR 0.54, hLR 0.74, fTR 0.30, fBR 3.2, mBR 4.2, hBR 5.0. Legs with large pulvilli.

Hypopygium in Fig. 5 h. Anal point (also in Fig. 5 i) bare, long, narrow, parallel-sided and apically pointted, ninth tergite with a group of setae flanking base of anal point. Dorsal appendages (Figs. 5 j,k) composed of a low, broad base bearing two long inner setae, and a long, slightly curved distal horn without lateral seta, entirely without microtrichia. Ventral appendage (Fig. 5m) slightly expanded apically, with 9 recurved setae arising on the distal portion, and one caudally directted apical seta. Gonostylus widest at about middle.

Remarks. This specimen belongs to the *nubifer* group of genus *Polypedilum,* and is closest to *P. kurobenudum* Sasa et Okazawa, 1992, in that dorsal appendage with long inner setae and AR is about 0.6 (0.45-0.48 in the latter), but the latter differs from the present species in that dorsal appendage is stout, strongly curved, and with microtrichia in the basal portion, as shown in Fig. 5m.

9. *Polypedilum (Polypedilum) yakucedeum* sp. nov. (Figs. 6 a-k)

A male, No.382:97, LT in the town of Miyanoura on March 24. BL 3.78mm, WL 1.66mm, WW/WL 0.29. Scutal stripes and postnotum brown, scutellum pale, legs yellow, abdominal tergites brownish yellow. Head in Fig. 6 a. Eyes bare, ER 0.23. Antenna with 13 flagellar segments, AR 1.11, AHR 0.51. P/H 1.14. SO 8:8, CL 10. Antepronotum (Fig. 6 b) only slightly separated, without seta. DM 16, DL 12:13, PA 6:5, SC 13 (Fig. 6 c).

Wing (Fig. 6 d) bare, without dark marks, squama with 16 fringe hairs, R2+3 in contact with R1, VR 1.47 (very high), R/Cu 1.13. Tip of fore tibia (Fig. 6 e) with a broad terminal process bearing two long and one short setae, tip of mid and hind tibiae (Figs. 6 f,g) with two comb scales, one with a long spur and the other without spur. Legs with large, brush-like pulvilli. fLR 2.10, mLR 0.59, hLR 0.76, fTR 0.25, fBR 2.5, mBR 3.8, hBR 4.9.

Hypopygium in Fig. 6 h. Anal point (also in Fig. 6 i) long, narrow, parallel-sided and bare. Dorsal appendage (Fig. 6 j) expanded both inwards and outwards, forming a shape somewhat like an inverted figure T, without setae and microtrichia, a quite peculiar form. Ventral appendage (Fig. 6 k) fingerlike, with 14 recurved setae and a long, caudally directed apical seta. Gonostylus widest at about basal 1/3.

Remarks. This specimen is considered as belonging to the *nubifer* group of genus *Polypedilum* in the basic structure, especially in that dorsal appendages are bare and without

long seta, but the shape somewhat like inverted figure T is quite characteristic not seen in the prpeviously recorded spepcies of this group.

10. *Polypedilum (Polypepdilum) nubeculosum* (Meigen, 1804)

A male, No.384:36, SWP at Shirotani River on March 27. This is a species with cosmopolitan distribution (Sasa & Sublette, 1979), and was collected widely from various localities in Japan.

11. *Polypedilum (Polypepdilum) okiflavum* Sasa, 1990 (Figs. 7 a-j)

Two males were collected, No.381:07,08, SWP at Takeno River on March 23. This species was recorded only once from Okinawa Island by the original author. Head in Fig. 7 a, antepronotum in Fig. 7 b, scutum and scutellum in Fig. 7 c, wing in Fig. 7 d, tips of tibiae in Figs 7 e,f,g, hypopygium in Fig. 7 h, dorsal appendage in Fig. 7 i, ventral appendage in Fig. 7 j. BL 3.06, 3.48mm, WL 1.60, 1.92mm, WW/WL 0.33, 0.32, ER 0.16, 0.16, AR 0.76, 0.70, AHR 0.46, 0.43, P/H 0.98, 1.23, SO 13:12, 12:11, CL 23, 16, PN 0, 0, DM 17, 16, DL 17:15, 20:19, PA 5:5, 5:6, SC 10, 10, SQ 8:8, 8:9, R2+3 in contact with R1, VR 1.31, 1.36, R/Cu 1.18, 1.16, fLR 1.69, 1.59, mLR 0.51, 0.49, hLR 0.70, 0.67, fTR 0.29, 0.26, fBR 3.3, 3.5, mBR 6.6, 6.8, hBR 7.5, 6.3. This species was recorded only once from Okinawa, and this is the second record.

12. *Polypedilum (Polypepdilum) tsukubaense* (Sasa, 1979) (Figs. 8 a-i)

Three males, No.382:55-57, SWP at Miyanoura River on March 24. The value of AR is 1.09, 1.14, 1.19, and smaller than in the type specimens of 1.38-1.69, but other measurement data are within the variation rangess of the type specimens. BL 3.52, 3.08, 3.38mm, WL 1.84, 1.68, 1.68mm, WW/WL 0.30, 0.31, 0.31. Head in Fig. 8 a. ER 0.26, 0.25, 0.28, AHR 0.51, 0.50, 0.52, P/H 1.32, 1.23, 1.36. SO 10 or 11 (10.2), CL 12, 10, 15. Antepronotum (Fig. 8 b) widely separated, PN all 0. Scutum and scutellum in Fig. 8 c; DM 18, 14, 15, DL 12 or 13, PA all 4, SC 12, 16, 12. Wing in Fig. 8 d. Squama with 7-9 (8.0) fringe hairs, R2+3 in contact with R1, VR 1.26, 1.27, 1.26, R/Cu 1.14, 1.12, 1.14. Tip of fore tibia (Fig. 8 e) with a broad and rounded process, tips of mid and hind tibiae (Figs. 8 f,g) with two terminal comb scales, one with a spur and the other without spur. Pulvilli large, brush-like.

Hypopygium in Figs. 8 h (dorsal) and i (ventral view). Anal point (also in Fig. 8 j) bare, long, narrow, parallel-sided and apically rounded. Dorsal appendages (Figs. 8 k,m) long, narrow, curved inwards and apically rounded, with 2 inner setae arising at about middle, and one lateral seta arising at about distal 1/3. Ventral appendage (Fig. 8 n) long, narrow and tapering towards rounded apex, with only 6 recurved setae and one long apical seta. Gonostylus nearly straight and widest at about basal 1/3.

Remarks. This species has been recorded from several localities in Japan (Sasa & Kikuchi, 1995, p.39), and is especially characterised in the strucure of dorsal appendages.

13. *Polypedilum (Polypedilum) yakudeeum* sp. nov. (Figs. 9 a-j)

A male, No.382:96, LT in the town of Miyanoura on March 24. BL 4.74mm, WL 2.56mm, WW/WL 0.28. Scutal stripes and postnotum dark brown, scutellum and femora, tibiae of legs and hypopygium yellowish brown, abdomen yellow. Head in Fig. 9 a. Eyes bare, ER 0.21. Antenna with 13 flagellar segments, AR 1.13, AHR 0.52. P/H 1.09. SO 16, 16, CL 36 (very many). Antepronotum (Fig. 9 b) tapering towards pointed apex and united in the midde (an unusual character as a *Polypedilum*), without seta. Setae on scutum and scutellum in Fig. 9 c. DM 22, DL 20, 24, PA 8:7, SC 29 (very many).

Wing (Fig. 9 d) bare, squama with 22 fringe hairs. R2+3 running close to R1 and in contact at the tip with R1. VR 1.26, R/Cu 1.20. Tip of fore tibia (Fig. 9 e) with a sharply pointed terminal process. Tips of mid and hind tibiae (Figs. 9 f,g) with two comb scales, one with a long spur and the other without spur. fLR 1.59, mLR 0.61, hLR 0.75, fTR 0.26. fBR 4.4, mBR 5.0, hBR 5.5. Pulvilli large, brush-like.

Hypopygium in Fig. 9 h. Anal point bare, long, narrow, nearly parallelsided and apically rounded. Dorsal appendage (also in Fig. 9 i) long, narrow, slightly curved and apically hooked and rounded, not expanded basally, with 2 or 3 inner setae near the base, and a long lateral seta arising at about distal 1/3. Ventral appendage (Fig. 9 j) long, narrow, with 16 recurved setae distributed on distal 2/3, and one long caudally directed apical seta. Gonostylus also long, narrow, and widest at about middle.

Remarks. This specimen belongs to the *nubeculosum* group of genus *Polypedilum*, and is characterised in that anal point is long and well-developed, dorsal appendage is also long, narrow and only slightly curved, scutal stripes are uniformly dark brown and abdomen uniformly yellow, and thus it is somewhat related to *P. okiflavum* Sasa, 1990, which was described first from Okinawa and also recorded from Yaku this time, but in this species AR is 0.66-0.70 and smaler, antepronotum is widely separated, and dorsal appendage is not expanded apically.

14. *Polypedilum (Uresipedilum) convictum* (Walker, 1856) (Figs. 10 a-d)

Four males, No.382:87-90, LT in the town of Miyanoura on March 24. BL 3.40-3.84 (3.60 in average of 4) mm, WL 1.72-1.87 (1.82)mm, WW/WL 0.31-0.34 (0.32). ER 0.27-0.30 (0.28), AR 1.80-1.91 (1.84), AHR 0.52-0.58 (0.54), P/H 1.07-1.23 (1.14), SO 12-13 (12.4), P/H 1.07-1.23 (1.14), PN all 0, DM 19-25 (21.0), PA 3-5 (4.1), SC 15-18 (16.8). Wing bare, SQ 9-14 (11.7), R2+3 in contact with R1, VR 1.17-1.24 (1.20), R/Cu 1.14-1.16 (1.15). fLR 1.55-1.68 (160), mLR 0.58-0.61 (0.59), hLR 0.70-0.77 (0.75), fTR 0.28-0.33 (0.30), fBR 2.6-2.9 (2.8), mBR 3.4-5.9 (4.9), hBR 5.1-9.5 (6.6). Hypopygium in Fig. 10 a. Anal point (also in Fig. 10 b) bare, rather stout, with lateral ridges. Dorsal appendage (also in Fig. 10 c) finger-like, largely clothed with microtrichia, with a long and narrow inner process, with one long basal inner seta, and a long caudally directed apical seta. Ventral appendage (Fig. 10 d) fingerlike, with 13 recurved setae and one long, caudally directed apical seta.

Remarks. This species has been collected also from many localities in Japan, and is especially characterized in the shape of dorsal appendages.

15. *Polypedilum (Uresipedilum) cultellatum* Goetghebuer, 1931 (Figs. 11 a-d)

Six males; No.382:40, SWP in the town of Miyanoura on March 23; No.383:80, SWP at Shirotani River on March 27; No.384:61-64, SWP at Shirotani River on March 27. BL 4.02-4.05 (4.28 in average of 6) mm, WL 2.04-2.22 (2.09) mm, WW/WL 0.28-0.31 (0.30). ER 24-31 (27), AR 1.63-1.84 (1.73), AHR 0.51-0.57 (0.53), P/H 0.81-1.11 (0.94). Antepronotum separated, without seta. DM 16-27, DL 20-34 (26.8), PA 4-8 (6.4), SC 18-24 (21.8). Wing bare, R2+3 in contact with R1, VR 1.21-1.26 (1.24), R/Cu 1.12-1.16 (1.14). fLR 1.63-1.76 (1.68), mBR 0.54-0.58 (0.56), hLR 0.69-0.73 (0.71), fTR all 0.28, fBR 2.4-3.6 (3.0), mBR 4.2-7.2 (5.4), hBR 5.4-8.9 (6.8). Legs with large pulvilli.

Hypopygium in Fig. 11 a. Anal point (also in Fig. 11 b) bare and rather short. Dorsal appendage (also in Fig. 11 c) with 3 or 4 basal inner setae and 2 or 3 apical setae, and with a large sickleshaped inner process. Ventral appendage as in Fig. 11 d.

Remarks. This species belongs also to the subgenus *Uresipedilum* of the genus *Polypedilum,* and has been recorded rather commonly also from Japan, but can be differentiated from the former species, *P. convictum,* at least by the structure of dorsal appendages.

16. *Cladotanytarsus yakuefeus* sp. nov. (Figs. 12 a-k)

A total of 17 males were collected; No.381:68-72, SWP at Nagata on March 23, No.381:84-93 SWP at Nagata on March 24, No.382:59,60, SWP at Miyanoura on March 24. Holotype: 381:71; paratypes: other males. BL 1.69-2.36 (202 in average of 8)mm, WL 0.94-1.12 (1.03)mm, WW/WL 0.34-0.37 (0.35, very wide), Scutal stripes and postnotum yellow, scutellum, legs and abdomen pale. Head in Fig. 8 a. Eyes reniform, ER 1.10-1.61 (1.41). Antenna with only 10 flagellar segments, AR 0.41-0.53 (0.46), AHR 0.27-0.40 (0.32). SO 6-8 (6.7), CL 10-16 (13.3). Antepronotum (Fig. 8 b) widely separated, without seta. DM 9-12 (11.1), DL 6-9 (6.7), PA all 1, SC 4-8 (6.5), as in Fig. 8 c.

Wing (Fig. 8 d) with small numbers of marcrotrichia on only distal half and on the principal veins. RR 0.52-0.68 (0.62), VR 1.33-1.50 (1.38), R/Cu 1.00-1.02 (1.01). Tip of fore tibia (Fig. 8 e) with a long, narrow and pointed apical process. Tips of mid and hind tibiae (Figs. 8 f,g) with 2 terminal comb scales, both with a long spur. Pullvilli vestigial (Fig. 8 h, hind tarsus V).

Abdominal tergites with small numbers of setae, 14 on Ⅰ, 12 on Ⅱ, 14 on Ⅲ and Ⅳ, and 16 on Ⅴ to Ⅷ in the holotype. Hypopygium in Fig. 8 h. Anal point (also in Fig. 8 i) rather stout, constricted at middle and apically rounded, with 2 lateral setae and entirely clothed with microtrichia. Dorsal appendage and digitus in Fig. 12 j. Median appendage (Fig. 12 k) about half as long as the ventral appendage, slender and with simple setae on inner margin. Ventral appendage (Fig. 12 m) finger-like, slightly expanded apically, with 12 short recurved setae and 3 hort caudally directed setae. Gonostylus slender and nearly straight.

Remarks. These specimens are considered as belonging to the genus *Cladotanytarsus* Kieffer, 1922,, since the basic structures are same as those of the genus *Tanytarsus* but wing with macrotrichia. They differ from the previously known species of this genus at least in that anal point is bottle-shaped, with lateral setae and entirely clothed with microtrichia but

without spine clusters. The shape of dorsal appendage and digitus is also quite characteristic. Antenna with only 10 flagellar segments, and AR is very small.

17. *Cladotanytarsus yakufegeus* sp. nov. (Figs. 13 a-m)

A male, No.384:74, SWP at Shirotani River on March 28. BL 2.20mm, WL 1.16mm, WW/WL 0.34, Scutal stripes and postnotum dark brown (darker than in the above species), other scutal areas, scutellum, legs and abdomen yellow. Head in Fig. 13 a. Eyes bare, reniform, ER 1.17. Antenna also with only 10 flagellar segments, AR 0.62 (larger than in the above species), AHR 0.42. P/H 1.00. SO 8:8, CL 14. Frons with a pair of rounded lobe in the middle, as in the above species, Antepronotum (Fig. 13 b) widely separated, without seta. DM 12, DL 7:7 PA 1:1, SC 5 (Fig. 13 c).

Wing (Fig. 13 d) with small numbers of macrotrichia only on distal 1/3, the numbers and mistribution more restricted than in the above species. Squama bare. RR 0.48, VR 1.35, R/Cu 1.00. Tip of fore tibia (Fig. 13 e) with a long and narrow terminal process. Tip of mid and hind tibiae (Figs. 13 f,g) with two separated and narrow comb scales, both with a spur. fLR 1.94 (very high), mLR 0.49, hLR 0.59, fTR 0.33, fBR 2.5, mBR 3.0, hBR 3.4. Pulvilli absent.

Abdominal tergites with small numbers of setae, 14 on Ⅰ, 10 on Ⅱ, 12 on Ⅲ and Ⅳ, 14 on Ⅴ and Ⅵ, and 12 on Ⅶ and Ⅷ. Hypopygium in Fig. 13 h . Anal point (also in Fig. 13 i) also low, slightly longer than wide and rounded, with 12 marginal setae. Dorsal appendage (also in Fig. 9 j) composed of a half oval shaped body bearing 3 lateral and 3 inner setae but without basal seta, and a sickle-shaped distal process. Digitus absent. Median apendage (Fig. 13 k) mediam in size and bearing only simple setae. Ventral appendage (Fig. 13 m) finger-like, with 8 short recurved setae on dorsal side and 3 short causally directed short setae on ventral side of apical portion. Gonostylus widest at about basal 1/3 and apically rounded.

Remarks. This specimen also belongs to the genus *Cladotanytarsus*, and is also quite characteristic in the shape and structure of anal point, dorsal and median appendages, and differs from the above species especially in the structure of dorsal appendage, being composed of oval body and sickle shaped distal process, and in the absence of digitus.

18. *Tanytarsus oyaberotundus* Sasa, Kawai et Ueno, 1988 (Figs. 14 a-m)

Four males, No.381:79, SWP at Issogawa River on March 24; No.383:90-92, SWP at Shirotani River on March 27. Body almost entirely pale yellow, even scutal stripes hardly discernible by color. In the 3 specimens collected at Shirotani, BL 3.38, 3.56, 3.48mm, 1.77, 1.65mm, WW/WL 0.30, 0.30, 0.31. Head in Fig. 14 a. Eyes bare, ER 75, 0.69, 0.69. Antenna with 13 flagellar segments, AR 0.97, 0.92, 0.89, AHR 0.47, 0.47, 0.51. P/H 1.18, 1.19. SO 13:12, 9:9, 8:8, CL 16, 17, 18. Small frontal tubercles present (Fig. 14 b). Antepronotum (Fig. 14 c) widely separated, PN all 0. DM 11, 17, 18, DL 10:9, 9:10, 8:9, PA all 1, SC all 4.

Wing (Fig. 14 d) with macrotrichia on distal half, squama bare. RR 0.41, 0.43, 0.45, VR 1.22, 1.24, 1.16, R/Cu 1.08, 1.08, 1.05. Tip of fore tibia (Fig. 14 e) with a long and narrow terminal process, tips of mid and hind tibiae (Figs. 14 f,g) with two comb scales, both with a

spur. fLR 2.64, 2.50, 2.65, mLR 0.59, 0.59, 0.60, hLR 0.73, 0.68, 0.74, fTR 0.37, 0.40, 0.36, fBR 3.6, 3.5, mBR 4.5, 3.8, 4.8, hBR 7.3, 6.7.

Abdominal tergites with relatively large numbers of setae as a member of *Tanytarsus,* 16 on I, 20 on II to VII, and 18 on VIII in No.383:91. Hypopygium in Fig. 14 h. Anal point (also in Fig. 14 i) V-shapepd for basal 2/3, and parallel-sided, apically rounded for distal 1/3, with lateral ridges, 5 spine clusters, and 3 lateral setae on both sides, basal setae absent. Dorsal appendage and digitus in Figs. 14 j (dorsal) and k (ventral view). The former roughly triangular but inner margin with two conspicuous processes, the caudal one with two setae, with 3 or 4 dorsal setae, and a strong basal seta arising on a large tubercle. Digitus long, expanded basally, and apically rounded. Median and ventral appendages in Fig. 14 m. The former short, with 4 inwards directed setae. Ventral appendage finger-like, with 8 recurved and 3 caudally directed short setae. Gonostylus widest at about basal 1/3.

Remarks. From the above described structure and measurement data, these specimens are classified into the *mendax* group of *Tanytarsus,* and to *T. oyaberotundus* Sasa, Kawai et Ueno, 1988, originally recorded from Oyabe River, Toyama, and later from several localities in the mainland of Japan and Okinawa (ref. Sasa & Kikuchi, 1995, p.50).

19. *Tanytarsus shouautumnalis* Sasa, 1988 (Figs. 15 a-m)

Fifteen males; No.383:82-87, 89-96, SWP at Shirotani River on March 27; No.384:68, SWP at Shirotani River on March 28. BL 3.24-3.69 (3.47 in average of 8)mm, WL 159-182 (174)mm, WW/WL 0.28-0.31 (0.30). Body almost entirely pale yellow, even scutal stripes hardly discernible by color. Figures are drawn from No.383:87. Head in Fig. 15 a. Eyes bare, each with dorsomedial extension, ER 0.92-0.97 (0.94). Antenna with 13 flagellar segments, AR 0.92-0.97 (0.95), AHR 0.42-0.50 (0.46). P/H 1.18-1.33 (1.24). Small frontal tubercles present (Fig. 15 b). Antepronotum (Fig. 15 c) widely separated, without seta. Scutum and scutellum in Fig. 15 d; DM 11-18 (14.6), DL 7-10 (8.5), PA all 1, SC all 4.

Wing (Fig. 15 e) with macrotrichia on almost entire surface, squama bare, RR 0.38-0.47 (0.42), VR 1.19-1.24 (1.22), R/Cu 1.08-1.11 (1.09). Tip of fore tibia (Fig. 15 f) with a long and narrow terminal process, tips of mid and hind tibiae (Figs. 15 g,h) with two comb scales, both with a spur. fLR 2.50-2.81 (2.66), mLR 0.59-0.63 (0.61), hLR 0.68-0.73 (0.71)), fTR 0.34-0.40 (0.37), fBR 2.8-3.8 (3.3), mBR 3.8-5.2 (4.6), hBR 3.7-7.3 (4.8). Tip of legs with small brush-like pulvilli.

Abdominal tergites with relatively small numbers of setae, 10 on I and II, 12 on III and IV, 14 on V and VI, and 12 on VII and VIII in No.383:87. Hypopygium in Fig. 15 i. Anal point bottle-shaped, abruptly constricted and about distal 1/3, with lateral ridges and 2-6 spine clusters, and lateral and basal setae. Dorsal appendage (also in Figs. 15 j, dorsal; 15 k, ventral view) half-egg shaped, inner margin slightly concave, with 4 lateral, 4 dorsal and 3 inner setae. Digitus long, nearly parallel-sided, extending much beyond inner margin of dorsal appendage. Median and ventral appendages in Fig. 15m. The former medium in size and with 6 simple setae. Ventral appendage finger-like, with 8 recurved and 3 caudally directed short setae. Gonostylus long and slender, widest at about middle.

Remarks. This species also belongs to the *mendax* group of genus *Tanytarsus,* and is characteristic especially in that body is almost entirely pale yellow, anal point is bottle-shaped and abruptly narrowed at about distal 1/3 and with lateral and basal setae, dorsal appendage is roughly half-egg shaped and inner margin slightly concave, digitus is long, and median appendage is relatively short and with simple setae directed inwards. This species was recorded first at Shou River, Toyama, and later also from Amami Island by Sasa and Suzuki (1993). In the type specimen, frontal tubercles are absent, and anal point with only 2 spine clusters.

20. *Tanytarsus tamaduodecimus* Sasa, 1983 G (Figs. 16 a-m)

Three males, No. 383:96-98, Shirotani River on March 27. BL 2.18, 2.54, 2.34mm, WL 1.18, 1.32, 1.30mm, WW/WL 0.31, 0.30, 0.31. Scutal stripes and postnotum yellow, other body portions only slightly yellowish. Head in Fig. 16 a. Eyes bare, ER 0.95, 1.00, 0.88. Antenna with 13 flagellar segments, AR 0.57, 0.60, 0.60, AHR 0.39, 0.35, 0.30. Palp long, P/H 1.10, 1.14, 1.07. SO 7:7, 7:7. 8:8, CL 11, 10, 10. Frontal tubercles absent. Antepronotum (Fig. 16 b) widely separated, PN all 0. DM 13, 12, 12, DL 6:6, 8:8, 5:5, PA all 1, SC all 4 (Fig. 16 c).

Wing (Fig. 16 d) with macrotrichia on distal 2/3. Squama bare, RR 0.43, 0.28, 0.41, VR 1.33, 1.19, 1.19, R/Cu 1.06, 1.11, 1.13. Tip of fore tibia (Fig. 16 e) with a long and narrow terminal process. Tips of mid and hind tibiae with two comb scales, both with a spur in mid tibia (Fig. 16 f), while one with a spur and the other without spur in the hind tibia (Fig. 16 g) in all the 3 specimens. fLR 2.33, mLR 0.62, 0.63, 0.62, hLR 0.73, 0.70, 0.72, fTR 0.36, mLR 0.62, 0.63, 0.62, hLR 0.73, 0.70, 0.72, fTR 0.36, fBR 4.1, mBR 5.3, 6.8, 5.4, hBR 4.1, mBR 5.3, 6.8, 5.4, hBR 4.5, 5.8, 5.6. Pulvilli absent.

Abdominal tergites with relatively small numbers of setae, 12 on Ⅰ to Ⅲ, 14 on Ⅳ and Ⅴ, 16 on Ⅵ and Ⅶ, and 14 on Ⅷ in the holotype. Hypopygium in Fig. 16 h. Anal point (also in Fig. 16 i) triagular, apically pointed, with lateral ridges and 6, 7, 5 spine clusters. Dorsal appendage (Figs. 16 j, dorsal; k, ventral view) roughly triangular, inner margin nearly straight and posterior corner slightly produced inwards, with 5 dorsal, 2 inner and 1 basal seta without basal tubercle. Digitus (Fig. 16 k) long, extending much beyond inner margin of dorsal appendage, apically rounded. Median appendage (Fig. 16m) small, composed of 3 codes directed inwards. Ventral appendage finger-like, with 8 recurved setae and 3 caudally directed short setae. Gonostylus long, narrow and nearly straight.

Remarks. These specimens belong to the *mendax* group of genus *Tanytarsus,* since anal point with lateral ridges and spine clusters, digitus long, and median appendage is short. The above described structure and measurement data are almost coincident with those of *T. tamaduodecimus* Sasa, 1983, but its type specimens have more numerous setae on median appendage, and small frontal tubercles are present. This species was originally described from Tama River, Tokyo, and later also from Toyama and Nagano Prefectures.

21. *Tanytarsus yakugeheuus* sp. nov. (Figs. 17 a-m)

A male, No.383:93, SWP at Shirotani River on March 27. BL 3.99mm, WL 1.94, WW/WL 0.27. Scutal stripes and postnotum brownish yellow, other body portions almost entirely pale yellow. Head in Fig. 17 a. Eyes bare, ER 0.68. Antenna with 13 flagellar segments, AR 1.04, AHR 0.54. P/H 1.17. SO 8:8, CL 14. Small frontal tubercles present (Fig. 17 b). Antepronotum (Fig. 17 c) widely separated, without seta. Scutum and scutellum in Fig. 17 d; DM 11, DL 10:10, PA 1:1, SC 2.

Wing (Fig. 17 e) with macrotrichia on almost entire surface, squama bare. RR 0.38, VR 1.11, R/Cu 1.06. Tip of fore tibia (Fig. 17 f) with a long, narrow and apically pointer terminal process. Tips of mid and hind tibiae (Figs. 17 g,h) with two comb scales, both with a spur. fLR 2.54, mLR 0.62, hLR 0.67, fTR 0.34, fBR 3.6, mBR 5.4, hBR 4.3. Pulvilli vestigial.

The numbers of setae on abdominal tergites are 10 on Ⅰ, 12 on Ⅱ, 16 on Ⅲ, 18 on Ⅳ to Ⅵ, and 16 on Ⅶ. Hypopygium in Fig. 17 i. Anal point widest at base and tapering towards rounded apex, with lateral ridges, 4 spine clusters and 6 lateral setae on both sides. Bands of ninth tergite separated. Dorsal appendage and digitus in Figs. 17 j (dorsal) and k (ventral view). The former roughly circular but with a peculiar ridge along posterior margin, a characteristic of this species, and with 2 lateral, 4 dorsal and 2 inner setae. Digitus long, parallel-sided and apically rounded, extending much beyond inner margin of dorsal appendage. Median and ventral appendages in Fig. 17m. The former medium in length and with 9 simple setae. The latter finger-like, with 8 recurved and 3 caudally directed setae arising from the apical portion. Gonostylus very long, narrow and slightly curved inwards.

Remarks. This specimen belongs also to the *mendax* group of genus *Tanytarsus,* and closest in structure to *T. tsutaprimus* Sasa et Okazawa, 1991, in that body almost entirely yellow, anal point parallel-sided in the distal portion and without basal seta, dorsal appendage roughly oval, digitus long, and gonostylus is long and narrow, but the latter differs from the present species in that frontal tubercles are absent, posterior margin of dorsal appendage is rounded and without a ridge (nearly straight and with an inwards produced ridge in the present species), and median appendage with numerous slightly foliate short setae (longer and with only simple setae in the present species).

22. *Tanytarsus yakuheius* sp. nov. (Figs. 18 a-p)

A male, No.384:03, SWP at Shirotani River on March 27. BL 3.38mm, WL 1.78mm, WW/WL 0.28. Scutal stripes and postnotum brownish yellow, other body portions almost entirely pale yellow. Head in Fig. 18 a. Eyes bare, ER 0.71. Antenna with 13 flagellar segments, AR 1.03, AHR 0.53. P/H 1.17 SO 8:8, CL 11. Large frontal tubercles present (Fig. 18 b), 40 μm long and 14 μm wide at the base. Antepronotum (Fig. 18 c) widely separated, without seta. DM 17, DL 9:7, PA 1:1, SC 4 (Fig. 18 d).

Wing (Fig. 18 e) with macrotrichia on almost entire surface, squama bare. RR 0.43, VR 1.21, R/Cu 1.11. Tip of fore tibia (Fig. 18 f) with a long and narrow apical process. Tips of mid and hind tibiae (Figs. 18 g,h) with two comb scales, both with a spur. fLR 2.76 (very high), mLR 0.63, hind tarsi lost, fTR 0.28, 3.0, mBR 6.4. Pivilli vestigial.

The numbers of setae on abdominal tergites are 14 on I, 20 on II to VI, 18 on VII, and 16 on VIII. Hypopygium in Fig. 18 i. Anal point (also in Fig. 18m) widest at base and tapering towards rounded apex, with lateral ridges, 4 spine clusters, 4 lateral setae on both sides, and 10 basal setae in two longitudinal rows. Dorsal appendage and digitus in Figs. 18 j, dorsal; k, ventral view. The former egg-shaped, with 5 lateral, 2 inner setae, and a basal seta arising on a large tubercle. Digitus (Fig. 18m) relatively short, completely hidden behind dorsal appendage. Median appendage (Fig. 18 n) very long, with simple setae, the distal setae extending beyond posterior margin of ventral appendage (Fig. 18 p), which is finger-like, and with 6 recurved and 3 caudally directed setae arising on the distal portion. Gonostylus widest at about middle.

Remarks. This specimen belongs to the *yunosecundus* group of genus *Tanytarsus*, since anal point with lateral ridges and spine clusters, digitus long, and median appendage is very long and distal setae extending beyond tip of ventral appendage. It is most closely related to *T. yunosecundus* Sasa, 1984 among the previously recorded species, in that AR is 1.13-1.17 in the latter, dorsal appendage is egg-shaped and bands of ninth tergite is separated, but the latter differs essentially from the present species in that digitus is long and sinuate, AR 1.13-1.17 (slightly larger than in the present species), and fLR is smaller, 2.33-2.39.

23. *Tanytarsus yakuijeus* sp. nov. (Figs. 19 a-p)

A total of 17 specimens were collected and examined; No.381:67, SWP at Nagata on March 23; No.383:81,88,99,100, No.384:01-06, all SWP at Shirotani River on March 27; No.384:66,67,69,72,73, SWP at Shirotani River on March 28. BL 2.66-3.52 (3.06 in average of first 10 specimens)mm, WL 1.42-1.76 (1.59)mm, WW/WL 0.27-0.30 (0.28)). Scutal stripes and postnotum brown, other body portions largey yellow. Head in Fig. 19 a. Eyes bare, ER 0.36-0.45 (0.41). Antenna with 13 flagellar segments, AR 0.87-0.97 (0.92), AHR 0.36-0.45 (0.41). P/H 1.17-1.35 (1.20). SO 10-14 (12.0), CL 16-26 (18.5). Frontal tubercles (Fig. 19 b) prominent, 15μm long and 7 μm wide. Antepronotum (Fig. 19 c) widely separrated, without seta. Scutum and scutellum in Fig. 19 d; DM 16-21 (18.5), DL 8-12 (10.2), PA 1 or 2 (1.4), SC 5-8 (6.3).

Wing (Fig. 19 e) with macrotrichia on almost entire surface, squama bare. RR 0.32-0.44 (0.38), VR 1.12-1.33 (1.23), R/Cu 1.08-1.11 (1.09). Tip of fore tibia (Fig. 19 f) with a long and narrow terminal process, tips of mid and hind tibiae (Figs. 19 g,h) with two comb scales, both with a spur. fLR 1.82-1.92 (1.87), mLR 0.62-0.64 (0.63), hLR 0.69-0.774 (0.72), fTR 0.23-0.28 (0.26), fBR 3.2-3.6 (3.4), mBR 5.1-7.4 (6.3), hBR 4.3-8.2 (6.3). Pulvilli vestigial.

The numbers of setae on abdominal tergites are relatively high in the numberrs, 30 on I, 32 on II, 36 on III and IV, 38 on V, 36 on VI and VII, and 32 on VIII in the holotype. Hypopygium in Fig. 19 i. Anal point (also in Fig. 19 j) relatively broad, low and apically rounded, with a pair of D-shaped ridge and 2 lateral and about 10 basal setae but without spine clusuters. Dorsal appendage and digitus in Figs. 19 k, m, (dorsal and ventral view). The former roughly half-egg shaped, inner margin slightly concave, with 4 lateral, 2 or 3 inner

setae, and a basal seta arising on a tubercle. Digitus large, slightly curved and with rounded apex. Median and ventral appendages in Fig. 19 n. The forner relatively long, with numerous setae, the tips of apical setae reaching to near apex of ventral appendage. The latter relatively short and stout, with 8 recurved setae, and 3 caudally directed apical setae (Fig. 19 p). Gonostylus long and narrow, inner margin slightly concave.

Remarks. This species is considered as belonging to the *usmaensis* group of *Tanytarsus,* since anal point with lateral ridges but without spine clusters, but is quite characteristic in that lateral ridges on anal point forming a pair of D-shaped groove, and median appendage is long and apical setae reaching to tip of ventral appendage, the characters which have not been seen in the previously recorded species of this group.

24. *Tanytarsus yakujekeus* sp. nov. (Figs. 20 a-m)

A male, No.382:58, SWP at Miyanoura River on March 24. BL 2.28mm, WL 1.28mm, WW/WL 0.34 (very wide). Body almost entirely pale yellow, even scutal stripes hardly discernible by color. Head in Fig. 20 a. Eyes bare, ER 0.73. Antenna with 13 flagellar segments, AR 0.39 (very small), AHR 0.34. P/H 0.95. SO 6:6, CL 15. Frontal tubercles absent. Antepronotum (Fig. 20 b) widely separated, without seta. DM 16, DL 7:7, PA 1:1, SC 4 (Fig. 20 c).

Wing (Fig. 20 d) with macrotrichia on distal half and along posterior margin, squama bare. RR 0.32, VR 1.52 (very high), R/Cu 1.11. Tip of fore tibia (Fig, 20 e) with a long and narrow terminal process, tips of mid and hind tibiae (Figs. 20 f,g) with two comb scales, both with a spur. Fore and hind tarsi all lost. mLR 0.59, mBR 4.1. Pulvilli absent.

Numbers of setae on abdominal tergites are 10 on Ⅰ to Ⅳ, 12 on Ⅴ, and 14 on Ⅵ to Ⅷ. Hypopygium in Fig. 20 h. Anal point (also in Fig. 20 i) long, constricted in the middle, with lateral ridges and lateral and basal setae but without spine clusters. Bands of ninth tergite separated. Dorsal appendage (Figs. 20 j, dorsal; k, ventral view) roughly elongate oval but distally rather angulate, with 5 dorsal, 2 inner and 1 basal seta arising on a small tubercle. Digitus absent. Median and ventral appendages in Fig. 20m. The former forked into two arms at the base, the ventral arm long and finger-like, with 6 simple setae along inner margin, the dorsal arm shorter and tapering towards pointed apex. Ventral appendage with a circular expansion apically, bearing 8 recurved and 2 caudally directed setae. Gonostylus slender, widest at about distal 1/3.

Remarks. This specimen belongs also to the *usmaensis* group of genus *Tanytarsus,* and it falls in *T. usmmaensis* Pagast, 1931 (described by Sasa and Kamimura, 1989, p.19, from Lake Akan) after the key prepared by Sasa and Kikuchi (1995, p.136), but in the latter bands of ninth tergite united in the middle (separated in the prpesentt specimen), dorsal appendage is roughly triangular (elongate oval in the prpesent specimen), and AR is 1.13-1.34 (0.39 in the present specimen).

25. *Brillia japonica* Tokunaga, 1939 (Figs. 21 a, b)

Five males were collected, No.381:01, SWP at Takeno River on March 23; No.382:39,

SWP at Miyanoura on March 23; No.382:53, SWP at Miyanoura on March 24; No. 382:95, LT in the town of Miyanoura on March 24, and No.384:90, LT in the town of Miyanoura on March 28. BL 3.34-4.88 (4.12 in average of 5)mm, WL 1.72-2.60 (2.16)mm, both highly varied, WW/WL 0.28-0.31 (0.29). Scutal stripes and postnotum brown, other scutal areas, scutellum and legs yellow. abdominal tergites I to V largely yellow but each with a narrow brown band along oral margin, VI to hypopygium brown. Eyes bare, ER 0.22-0.28 (0.25). Antenna with 13 flagellar segments, AR 0.65-0.90 (0.79), AHR 0.35-40.5 (0.41). P/H 1.00-1.39 (1.26). SO 32-56 (42.9), CL 28-56 (40.8), both very many. Antepronotum (Fig. 21 a) united, with 22-44 (36.2) setae distributed continuously from the top to lateral end. DM 0, DL 44-102 (76.0), PA 16-43 (27.9), SC 30-83 (55.6). Wing almost entirey clothed with macrotrichia, squama with 22-36 (29.0) fringe hairs. R2+3 in contact with R1, RV 1.24-1.57 (1.35), R/Cu 1.14-1.22 (1.17). Tip of fore tibia with 1, mid tibia with 2 long spurs, tip of hind tibia with 1 long, 1 short spur, and a comb commposed of 9-10 spines. All spurs are barbed and darkly pigmented. fLR 0.80-0.83 (0.81), mLR 0.49-0.52 (0.51), hLR 0.52-0.55 (0.53), fTR 0.12-0.16 (0.14), fBR 2.2-2.9 (2.7), mBR 3.0-4.6 (3.8), hBR 3.0-59 (4.2). Pulvilli absent.

Hypopygium in Fig. 21 b. Anal point absent, ninth tergite with tortoise shell-like patterns, and with some 20 long setae in the middle portion. Inner lobe of gonocoxite very long and narrow, finger-like and slightly curved, entirely clothed with microtrichia. Gonocoxite with another low and broad lobe distally, bearing strong setae. Gonostylus forked into two long arms, the inner lobe 0.70-0.82 (0.75) time as long as the lateral arm, the former bare, the latter with 5 short subapical setae on inner margin.

Remarks. This species was described by the original author with specimens collected in Kyoto, and later by Sasa and coauthors from Tama River, Tokyo and from several rivers in Toyama.

26. *Brillia modesta* (Meigen, 1839) (Figs. 22 a,b)

A male, No.383:14, SWP at Yakushima Land on March 25. BL 4.08mm, WL 2.32mm, WW/WL 0.28. Scutal stripes and postnotum dark brown, other scutal areas, scutellum and legs yellowish brown, abdominal tergites almost uniformly brown. ER 0.47, AR 1.35, AHR 0.57, P/H 1.24, SO 34:34, CL 18. Antepronotum (Fig. 22 a) widely separated, with a group of 5:5 setae on the top and another group of 8:8 setae in the lateral areas. DM 0, DL 44:42, PA 14:15, SC 30. Wing with macrotrichia on almost entire surface, SQ 22:24, R2+3 in contact with R1, VR 1.26, R/Cu 1.14. Terminal structure of tibiae as in the former species. fLR 0.90 (very high), mLR 0.53, hLR 0.55, fTR 0.15, fBR 2.9, mBR 3.9, hBR 5.1. Pulvilli absent.

Hypopygium in Fig. 22 b. Anal point absent, ninth tergite with 12 long setae in the middle portion. Inner lobe of gonocoxite long, finger-like but not curved as in the former species, with sparsely distributed microtrichia. Gonocoxite without the distal lobe. Gonostylus forked into two arms, the inner margin.

Remarks. This specimen belongs also to the genus *Brillia,* but differs from the above species especially in that abdominal tergites are almost uniformly brown, AR is 1.35 and larger, ER is larger but CL is smaller, setae on antepronotum are separated into the dorsal

and the ventral groups and all very short, inner lobe of gonocoxite is also finger-like but not curved, gonocoxite without distal lobe, and two arms of gonostylus are about equal in length and apically pointed.

27. *Cricotopus bicinctus* (Meigen, 1818)

A male, No.382:11, SWP at Issogawa on March 24. This is a cosmopolitan species, and has been recorded from more than 10 localities in Japan, including Okinawa Islands.

28. *Cricotopus jogantertius* Sasa, Kawai et Ueno, 1988

Twelve males; No.381:39-41 and 382:14,15, SWP at Issogawa on March 24; 383:24,25,39,72-75 SWP at Senpirotaki on March 26. This species has been recorded only once by the original authors from a river in Toyama.

29. *Cricotopus metatibialis* Tokunaga, 1936

A male, No.381:59, SWP at Nagata on March 23. This is a species described by the original author from Kyoto, and has been recorded at least 5 localities in the mainland of Japan by Sasa and coworkers.

30. *Cricotopus tamapullus* Sasa, 1981

Thirteen males; No.381:45-49, SWP at Nagata on March 23; Np.382:42-45, 84-87, SWP at Shirotanikawa on March 27 and 28. This species was recorded only once by the original author from Minamiasakawa River, Tokyo.

31. *Paratrichocladius rufiventris* (Meigen, 1830)

Five males; No.381:50,50,56, SWP at Nagata on March 23; No.382:13,16, SWP at Issogawa on March 24. This species was originally recorded from Europe, but has been recorded also from Japan from more than 10 localities by Sasa and coworkers (Sasa & Kikuchi, 1995, p.57).

32. *Paratrichocladius yakukeleus* sp. nov. (Figs. 23 a-k)

Two males, No.382:10, SWP at Issogawa on March 24; No.383:71, SWP at Senpirotaki on March 26. BL 3.82, 2.76mm, WL 1.61, 1.38mm, WW/WL 0.31, 0.31. Scutum, scutellum and postnotum largelly black, but scutum has a pair of large humeral pits anterior to the lateral stripes. Legs largely brown. Abdominal tergites I, IV and V pale, other tergites brown. Head in Fig. 23 a. Eyes pubescent, reniform and inner margin concave, ER 0.50, 0.61. Antenna with 13 flagellar segments, AR 0.91, 0.86, AHR 0.45, 0.47. SO 2+3, CL 12, 18. Antepronotum (Fig. 23 b) united, with 1:1, 1:1 lateral seta. Scutum and scutuellum in Fig. 23 c. DM minute, 8:8. DL 40:34, 32:28, all very short but arising from large pale pits. PA all 4, SC 12, 14, also very short.

Wing (Fig. 23 d) bare, smooth, squama with 12:15, 8:8 fringer hairs, RR 0.53, 0.56, VR 1.23, 1.16, R/Cu 1.04, 1.03. Cu2 nearly straight. Tip of fore tibia (Fig. 23 e) with a long (36

μm) terminal spur, tip of mid tibia (Fig. 23 f) with two short spurs (12, 20μm), tip of hind tibia (Figs. 23 g,h) with a long (55μm) and a short (16μm) spur, and a comb composed of 14 free spines. fLR 0.64, 0.63, mLR 0.49, 0.50, hLR 0.60, 0.59. fTR 0.13, 0.14, fBR 2.3, 1.8, mBR 2.3, 2.3, hBR 2.3, 2.6. Pulvilli vestigial.

Distribution of setae on abdominal tergites in Fig. 23 i, the numbers are 22 on I, 28 on II and III, 26 on IV, 24 on V, 22 on VI, and 18 on VII and VIII. Hypopygium in Fig. 23 j. Anal point and virga absent, ninth tergite with 6 short setae in the middle portion. Inner lobe of gonocoxite rather complicated in the structure, double layered and the ventral lobe is divided into two rounded processes. Gonocoxite has a low and rounded lobe near the base. Gonostylus (also in Fig. 23 k) is nearly straight, widest near apex, with a small rectangular preapical tooth.

Remarks. These two specimens are considered as belonging to the genus *Paratrichocladius* Abreu, 1918, since eyes are pubescent and reniform, wings are bare and smooth, dorsolateral setae are arising on large pale pits, and anal point is absent. However, they are quite unusual as a member of this genus in that abdominal tergites I IV and V are pale and other tergites are dark brown, like in some *Cricotopus* species, seta on scutum and scutellum are very short also like in *Cricotopus* species, and thus is intermediate in the structure between these two genera.

33. *Rheocricotopus yakulemeus* sp. nov. (Figs. 24 a-i)

A male, No.381:44, holotype, SWP at Nagata on March 23. BL 3.04mm, WL 1.52mm, WW/WL 0.33. Body almost uniformly black. Head in Fig. 24 a. Eyes pubescent, oval, inner margin convex and without dorsomedial extension, ER 1.38. Antenna with 13 flagellar segments, AR 1.19, AHR 0.51. P/H 1.05. SO 1+3, 1+3, CL 16. Antepronotum (Fig. 24 b) thickly united, with 4:4 tiny lateral setae. Scutum with a pair of large humeral pits in front of lateral stripes, DM 0, DL 19:21, all short but arising on large pale pitts, PA 3:3, SC 14 (Fig. 24 c).

Wing bare, smooth and slightly brownish. Squama with 7:8 fringe hairs. Costa not extending beyond tip of R4+5, which is slightly distal to tip of Cul, R/Cu 1.09. R2+3 separated, RR 0.56, VR 1.17. Tip of fore tibia (Fig. 24 d) with a long spur, tip of mid tibia (Fig. 24 e) with 2 short spurs, tip of hind tibia (Figs. 24 f,g) with a long and a short spur, and a comb composed of 5 free spines. fLR 0.64, mLR 0.56, hLR 0.61, fTR 0.14, fBR 2.6, mBR 2.7, hBR 2.8. All legs with well-developed brush-like pulvilli (Fig. 24 h, fore tarsus V).

Abdominal tergites (Fig. 24 i) with relatively small numbers of setae, 30 on I, 32 on II, 26 on III to V, and 24 on VI to VIII, all well developed and long, those on II to V are arranged into the median, intermediate and lateral groups. Hypopygium in Fig. 24 j. Anal point robust, widest at base and apically rounded, clothed with microtrichia except for the tip, and 4 lateral setae on both sides. Inner lobe of gonocoxite double-layered, broad and rounded, bearing 10 marginal setae. Gonostylus nearly straight, widest near the tip, with a strong megaseta but without preapical swelling.

Remarks. This specimen belongs to the subgenus *Rheocricotopus* of the genus

Rheocricotopus Thienemann et Harnisch, 1932, since eyes are pubescent and reniform, scutum with a pair of large humeral pits, dorsolateral setae of scutum arising on large pale pits, setae on abdominal tergites are arranged into longitudinal rows and not on transverse rows, and anal point is robust and bearing lateral setae. It is closest to *R. okifoveatus* Sasa, 1990 among the previously recorded species of this subgenus, especially in that AR is slightly larger than 1.0, DM are absent, costa not extended beyond tip of R4+5, and inner lobe of gonocoxite without processes, but the latter differs from the presentt species in that gonostylus with a prominent preapical tooth.

Key for classification into the groups (Sasa & Kikuchi, 1995, p.157) of the species of genus *Eukiefferiella* collected on Yaku.

1- R2+3 in contact with R4+5 2
- R2+3 separated from R4+5 6
2- Squama fringed, eyes bare 3
- Squama bare 4
3- Anal point present (*tamaflava* gr.) *tamaflava* Euk-T
- Anal point absent (*yasunoi* gr.) Euk-N, Euk-O (see note)
4- Eyes pubescent 5
- Eyes bare, anal point absent (*yaraensis* gr.) Euk-S
5- Anal point present (*tokuokasia* gr.) Euk-M
- Anal point absent (*coerulescens* gr.) Euk-P
6- Squama fringed; eyes bare 7
- Squama bare 8
7- Anal point present (*tamaparvula* gr. or *Synorthocladius*) Euk-R
- Anal point absent (*chuzeoctava* group)
8- Eyes pubescent; anal point present (*amamipubescia* gr.) Euk-Q
- Eyes bare; anal point absent (*asamaquarta* gr.)

Note: Euk-N and Euk-0 can be differentiated by that AR is 0.90-1.00 in the former, 0.44 in the latter, DM is absent in the former, minute but present, 6-12 in the latter.

34. *Eukiefferiella tamaflava* Sasa, 1981 (Figs. 25 a-d) Euk-T

Eleven males were collected. No.383:06-12 (7), LT at the town of Miyanoura on March 24; No.386:51-55 (5) also LT at the town of Miyanoura on March 28. Scutal stripes and postnotum brown, other body portions largely brownish yellow. BL 1.84-2.23 (2.02 in average of 11)mm, WL 1.04-1.26 (1.13)mm, WW/WL 0.34-0.37 (0.35, very wide). Head in Fig. 25 a. Eyes bare, reniform, ER 1.17-1.36 (1.28). Antenna with 13 flagellar segments, AR 0.40-0.49 (0.45). P/H 0.79-0.91 (0.87). SO 3 or 4 (3.2), CL 6-11 (7.3). Antepronotum Fig. 25 b) united, with 0 or 1 lateral seta. Scutum and scutellum in Fig. 25 c. DM all 0, DL 7-9 (8.0), PA all 3, SC 4-6 (5.1). Wing bare, smooth, SQ 4-6 (4.4), R2+3 in contact with R4+5, VR 1.35-1.54 (1.44, very high). Tip of R4+5 much proximal to tip of Cul, R/Cu 0.90-0.94 (0.92). Costa

extended much beyond tip of R4+5, but ending still much proximal to tip of wing. fLR 0.77-0.82 (0.79), mLR 0.48-0.50 (0.49), hLR 0.56-0.58 (0.57), fTR 0.16-0.18 (0.17), fBR 2.6-4.2 (3.1), mBR 3.8-4.9 (4.2), hBR 4.0-6.8 (5.5).

Hypopygium in Fig. 25 d. Anal point long, widest at base and tapering towards pointed apex, with a pair of lateral setae near the base, and largely clothed with microtrichia. Virga prominent, composed of two codes situated on a cup. Inner lobe of gonocoxite large and nearly rectangular. Gonostylus simple, nearly straight and without preapical swelling.

Remarks. The above measurement data and the structures are almost coincident with those of *E. tamaflava* Sasa, 1981, originally collected from Tama River, Tokyo, and later also from two rivers in Toyama and Nagano.

35. *Eukiefferiella yakumenea* sp. nov. (Figs. 26 a-i) yaku-M

A male, No.383:70, holotype, SWP at Anbokawa on March 26. BL 2.18mm, WL 1.12mm, WW/WL 0.38 (very wide). Scutal stripes and postnotum brown, other scutellar areas, scutellum, legs and abdomen yellow. Head in Fig. 26 a. Eyes pubescent, reniform, ER 0.52. Antenna with only 12 flagellar segments, AR 0.34 (very small), AHR 0.24. Palp very short, P/H 0.67. SO 0:0 (quite unusual), CL 4. Antepronotum (Fig. 26 b) united, lateral setae not detectable. Setae on scutum and scutellum in Fig. 26 c. DM 14, all minute, DL 10:10, PA 3:3, SC 6.

Wing in Fig. 26 d. Membrane bare, smooth. Squama bare. R2+3 in contact with R4+5, VR 1.57 (very high). Costa extending much beyond tip of R4+5, but ending much proximal to tip of wing, R/Cu 0.80 (very low). Tip of fore tibia (Fig. 26 e) with a long (41 μm) spur. Tip of mid tibia (fig. 26 f) with two short spurs (9 and 20 μm). Tip of hind tibia (Fig. 26 g) with a long (37 μm) and a short (16 μm) spur, and a comb composed of 11 free spines. Tips of mid and hind tarsi without spines. fLR 0.40, mLR 0.40, hLR 0.46 (all very small); fTR 0.16, fBR 2.1, mBR 2.6, hBR 2.8. Tarsi Ⅳ cylindrical and longer than tarsi Ⅴ. Puulvilli absent.

Setae on abdominal tergites (Fig. 26 h) are 20 on Ⅰ to Ⅳ, 16 on Ⅴ and Ⅵ, and 12 on Ⅶ and Ⅷ. Hypopygium in Fig. 26 i. Anal point small, triangular and sharply pointed apically. Virga not detectable. Inner lobe of gonocoxite large, longer than wide and with strong setae. Gonostylus simple, straight, nearly parallel-sided and without preapical swelling.

Remarks. This specimen belongs to the genus *Eukiefferiella* in wider sense, and to the *tokuokasia* group of the classification of Sasa & Kikucghi (1995, p.158), since eyes are pubsecent and reniform, squama bare, R2+3 is in contact with R+45, and anal point is present, and closest to *E. tokuokasia* Sasa, 1989, but the latter differs from the present species at least in that anal point is much larger, and inner lobe of gonocoxite is not rounded but acutely angulate.

36. *Eukiefferiella yakuneoa* sp. nov. (Figs. 27 a-j) Euk-N

Six males; No.381:61,62, SWP at Nagata on March 23; No.376:21-24, L at Miyanoura Town on March 28. Holotype: No.381:61. Paratypes: other 5 males. BL 1.99-2.38 (2.19 in

average of 6)mm, WL 1.00-1.34 (1.17)mm, WW/WL 0.32-0.36 (0.34). Scutal stripes and postnotum dark brown, other scutal areas, scutellum, legs and abdomen yellow. Head in Fig. 27 a. Eyes bare, reniform, ER 11.15-1.64 (1.38). Antenna with 13 flagellar segments, AR 0.88-1.00 (0.94), AHR 0.42-0.46 (0.44). P/H 0.71-0.92 (0.80). SO all only 2, CL 7 or 8 (7.6). Antepronotum (Fig. 27 b) united, with 0 or 1 lateral seta. Scutum and scutellum in Fig. 27 c. DM all 0, DL 6-8 (6.7), PA all 3, SC 4 or 6 (5.0).

Wing bare, membrane smooth, venation in Fig. 27 d. R2+3 in contact with R4+5, VR 1.27-1.38 (1.34), tip of R4+5 proximal to tip of Cul, R/Cu 0.84-0.90 (0.87). Costa extended beyond tip of R4+5, but ending much proximal to tip of wing. Cu2 nearly straight. Squama with 3-6 (most frequently 4, mean 4.2) fringe hairs. Tip of fore tibia (Fig. 27 e) eith a long spur, tip of mid tibia (Fig. 27 f) with two short spurs, tip of hind tibia (Fig. 27 g) with a long and a short spur, and a comb composed of 11 or 12 free spines. fLR 0.75-0.83 (0.79), mLR 0.44-0.46 (0.45), hLR 0.53-0.56 (0.55), fTR 0.17-0.19 (0.18), fBR 2.2-2.8 (2.5), mBR 2.5-2.8 (2.7), hBR 2.6-3.0 (2.8). Legs with a pair of small brush-like pulvilli (Fig. 27 h, hind tarsus V).

Abdominal tergites (Fig. 27 i) with small numbers of setae, 14 on I and II, 11 on III,m 10 on IV, 13 on V, 15 on VI, and 9 on VII and VIII in the holotype. Hypopygium in Fig. 27 j. Anal point and virga absent. Inner lobe of gonocoxite longer than wide, with rounded margin, bearing numerous short setae and microtrichia. Gonostyus simple, slender, parallel-sided and without preapical swelling.

Remarks. This species belongs to the *yasunoi* group of genus *Eukiefferiella,* since R2+3 is in contact with R4+5, tip of R4+5 is proximal to tip of Cul, squama is fringed, eyes bare, and anal point is absent. It is closet to *E. togaeusecunda* Sasa et Okazawa, 1992, among the previously known species of this group, as DM setae are absent and inner lobe of gonocoxite is single, but the latter differs from the present species in that AR is 0.36-0.46 and much smaller, inner lobe of gonocoxite is much broader and lower, and gonostylus has an acutely angulate preapical tooth.

37. *Eukiefferiella yakuopea* sp. nov. (Figs. 28 a-i) Euk-O

Twelve males; No.381:75, SWP at Nagata on March 23; No.381:94-96, 382:08, SWP at Issokawa on March 24; No.383:13, LT at the town of Miyanoura on March 24, No.383:28, SWP at Yakusugi Land on March 25; No.384:47-52, SWP at Shirotani River on March 27. Holotype: No.381:94. Paratypes: other 1 males. A male, No.381:75 is much smaller, BL 1.60mm, WL 0.88, WW/WL 0.38, ER 1.50, other measurement data are within the variation ranges. In other 11 specimens, BL 2.12-2.28 (2.16 in average)mm, 1.07-1.16 (1.11)mm, WW/WL 0.35-0.36. Scutal stripes and postnotum brown, other scutal areas, scutellum and legs largely yellow. Head in Fig. 28 a. Eyes reniform, ER 1.20-1.35 (1.30), inner margin slightly concave, highly pubescent. Antenna with only 12 flagellar segments, AR 0.22-0.33 (0.25, very small), AHR 0.24-0.32 (0.28). P/H 0.76-0.91 (0.84). SO 1, 2 or 3 (2.0), CL 5 or 6 (5.8). Antepronotum (Fig. 28 b) narrowly united, all with 1:1 lateral seta. Scutum and scutellum in Fig. 28 c. DM 3-8 (6.8), all minute; DL 8-12 (9.1), PA 3 or 4 (3.3), SC 4, 5 or

6 (5.0).

Wing (Fig. 28 d) bare, finely granular, brownish, squama bare. R2+3 in contact with R4+5. VR 1.50-1.57 (1.53, very high). Tip of R4+5 much proximal to tip of Cu, R/Cu 0.80-0.86 (0.83). Cu2 nearly straight. Tip of fore tibia (Fig. 28 e) with a long spur, tip of mid tibia (Fig. 28 f) with 2 spurs, tip of hind tibia (Fig. 28 g) with a long and a short spur, and a comb composed of 11 free spines. fLR 0.40-0.43 (0.41), mLR 0.38-0.43 (0.41), hLR 0.44-0.48 (0.46), all very small. fTR 0.14-0.17 (0.15), fBR 2.0-2.7 (2.3), mBR 2.4-3.3 (2.8), hBR 2.7-2.8. Pulvilli vestigial.

Abdominal tergites (Fig. 28 h) with small numbers of setae, 12 on Ⅰ, 14 on Ⅱ, 16 on Ⅲ, and 10 on Ⅳ to Ⅷ in the holotype. Hypopygium in Fig. 28 i. Anal point absent, virga composed of 2 codes 22 μm long. Inner lobe of gonocoxite longer than wide and posterior margin rounded, with some 10 setae and entirely clothed in microtrichia. Gonostylus simple, narrow and nearly straight, without preapical swelling.

Remarks. This species belongs to the *coerulescens* group of genus *Eukiefferiella* in wider sense, since R2+3 is in contact with R4+5, squama bare, eyes pubescent, and anal point is absent, and is closest to *E. coerulescens* (Kieffer, 1926) and to *E. togaeutertia* Sasa et Okazawa, 1992, in that tip of R4+5 is proximal to tip of Cu 1 and DM present, but both species described from Japan differs from the present species at least in that antenna with 11 flagellar segments, in the shape of inner lobe of gonocoxite, shape of gonostylus stouter, and the body coloration being much darker in *E. coerulescens.*

38. *Eukiefferiella yakupequea* (Figs. 29 a-m) Euk-P

A male, No.383:35, holotype, SWP at Yakusugi Land on March 25. BL 1.52mm, WL 0.96mm, WW/WL 0.38 (very wide). Scutal stripes and postnotum brownish yellow, other scutal portions, scutellum, legs and abdomen largely yellow. Head in Fig. 29 a. Eyes pubescent, each with a small dorsomedial projection, ER 1.00. Antenna with only 10 flagellar segments, AR 0.61, AHR 0.28. Palp short, P/H 0.87. Antepronotum (Fig. 29 b) very narrowly united, with 1:1 lateral seta. Setae on scutum and scutellum in Fig. 29 c (lateral view of left half); DM 8, all minute, DL 5:5, PA 3:3, SC 6, all relatively long.

Wing membrane bare and smooth, venation in Fig. 29 d; squama bare. R2+3 separated, RR 0.55. VR .33. Costa extended much beyond tip of R4+5, which is much proximal to tip of Cul, R/Cu 0.85. Cu2 slightly curved near apepx. Tip of fore tibia (Fig. 29 e) with a long spur (25 μm). Tip of mid tibia (Fig. 29 f) with two short spurs (9 and 12 μm). Tip of hind tibia (Fig. 29 g) with a long spur (42 μm) but without short spur, and a comb composed of 11 free spines arising on a line oblique to its posterior margin and thus their tips mostly do not extend beyond posterior margin of hind tibia (quite an unusual character). fLR 0.49, mLR 0.48, hLR 0.51, fTR 0.14, fBR 3.3, mBR 2.3, hBR 2.5. Pulvilli absent.

Abdominal tergites with very small numbers of setae, mostly only 6 from Ⅰ to Ⅶ. Eighth tergite and hypopygium in Fig. 29 h. The former roughly triangular (quite an unusual shape), with 4 long setae. Anal point (also in Fig. 29 i, lateral view) composed of a long and low base bearing microtrichia and two lateral setae, and a bare, long, narrow and straight

apical horn. Inner lobe of gonocoxite (Figs. 29 j, left; k, right) long, low and double layered, posterior margin rounded, bearing numberous setae and microtrichia. Gonostylus (Figs. 29 m, left, ventral view; n, right, lateral view) curved inwards, widest near apex, with a small preapical tooth.

Remarks. This specimen is also a member of genus *Eukiefferiella* in wider sense, since eyes are pubescent and without long dorsomedial extension, antenna composed of only 10 flagellar segments and without apical seta, dorsolateral setae of scutum are well developed, and pulvilla are absent. It further belongs to the *amamipubescia* group in the sense of Sasa & Kikuchi (1995, p.157) in that eyes are pubescent and anal point is present, but the only one species recorded as its member, *E. amamipubescia* Sasa, 1990, differs essentially from the present species at least in that anal point is long, narrow, apically pointed and bearing 5 lateral setae, inner lobe of gonocoxite is simple and rounded, pulvilli present, AR 0.29-0.39 (much smaller), and R/Cu is larger than 1.1.

39. *Eukiefferiella yakuquerea* sp. nov. (Figs. 30 a-j) Euk-Q

Eight males were collected; No.381:64, SWP at Nagata on March 23; No.383:26,27,29,30,34,53,54, SWP at Yakusugi Land on March 25. Holotype: No.383:53. Paratypeps: other seven males. BL 1.98-2.59 (2.24 in average of 8)mm, WL 1.20-1.50 (1.38)mm, WW/WL 0.32-0.36 (0.34). Scutal stripes and postnotum brown, other scutal areas, scutellum, legs and abdomen yellow. Head in Fig. 30 a. Eyes bare, reniform, ER 1.14-1.32 (1.23). Antenna with 13 flagellar segments, AR 0.44-0.55 (0.48), AHR 0.31-0.38 (0.35). P/H 0.73-0.91 (0.82). SO 2 or 3 (2.6), CL 4-7 (5.3). Antepronotum (Fig. 30 b) united, with 1 or 0 lateral seta. Scutum and scutellum in Fig. 30 c; DM 4-12 (8.8), all minute. DL 4-7 (5.1), PA all 3, SC all 4.

Wing (Fig. 30 d) bare, squama with 1-4 (mean, 2.5, very small in the numbers) fringe hairs. R2+3 in contact with R4+5. VR 1.28-1.43 (1.36). Tip of R4+5 almost on the same level as tip of Cul, R/Cu 0.88-1.02 (0.97). Costa extended much beyond tip of R4+5. Cu2 nearly straight. Anal lobe obtuse. Tip of fore tibia (Fig. 30 e) with a long spur, tip of mid tibia (Fig. 30 f) with two short spurs, tip of hind tibia (Fig. 30 g) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.70-0.77 (0.74), mLR 0.44-0.48 (0.46), hLR 0.52-0.58 (0.55), fTR 0.14-0.16 (0.15), fBR 1.8-2.9 (2.3), mBR 2.2-4.6 (3.3), hBR 2.8-4.4 (3.6). Pulvilli absent (Fig. 30 h, front tarsus V).

Abdominal tergites (Fig. 30 i) with relatively small numbers of setae, 12 on I, and 16 on II to VIII in the holotype. Hypopygium in Fig. 30 j. Anal point and virga absent. Inner lobe of gonocoxite prominent, slightly longer than wide and apically rounded. Gonostylus slender, nearly parallel-sided, without preapical tooth.

Remarks. This species belongs also to the *yasunoi* group of genus *Eukiefferiella*, since eyes are reniform and bare, R2+3 is in contact with R4+5, squama is fringed, and anal point is absent. However, it differs from the avove species, at least in that DM is present and AR is much smaller. It is most closely related to *E. yasunoi* Sasa, 1979, in that AR is about 0.44 and in the shape of inner lobe of gonocoxite and gonostylus, but in *E, yasunoi* the psterior

margin of ninth tergite is nearly flat, while it is conspicuously expanded in the middle and rounded in the present species. This species is differentiated from the former species by that DM setae are present, and AR is much smaller.

40. *Eukiefferiella yakuresea* (Figs. 31 a-i) Euk-R

Two males; holotype: No.383:28; paratype: 383:31; both SWP at Yakusugi Land on March 25. BL 2.28, 2.14mm, WL 1.21, 1.22mm, WW/WL 0.31, 0.30. Scutal stripeps and postnotum brown, scutellum, abdomen and legs yellow. Head in Fig. 31 a. Eyes bare, reniform, ER 1.05, 1.00. Antenna with 13 flagellar segments, AR 0.84, 0.78, AHR 0.46, 0.44. P/H 0.89, 1.08. SO 8:8, 6:6, CL 8, 6. Antepronotum (Fig. 31 b) united, with 1:1, 2:1 lateral setae. Scutum and scutellum in Fig. 31 c. DM 8, 12, all minute. DL 8:8, 7:7, PA 3:3, 4:4, SC 6, 5. Wing (Fig. 31 d) bare, squama with only 2:2, 2:1 fringe hairs, anal lobe obtuse. R2+3 separated, RR 0.43, 0.45. VR 1.12, 1.20, R/Cu 1.13, 1.11. Cu2 nearly straight. Tip of fore tibia (Fig. 31 e) with a long spur, tip of mid tibia (Fig. 31 f) with two short spurs, tip of hind tibia (Fig. 31 g) with a long and a short spur, and a comb composed of 10 free spines. fLR 0.56, mLR 0.43, hLR 0.58, fTR 0.15, fBR 2.6, 2.8 3.5. Tarsi I and II of middle and hind legs without terminal spur. Pulvilli large, brush-like.

Abdominal tergites (Fig. 31 h) with relatively small numbers of setae, 18 on I, 22 on II, 25 on III, 26 on IV to VII, ad 20 on VIII in the holotype. Hypopygium in Fig. 31 i. Anal point robust, widest at base and tapering towards pointed apex, with 12 long lateral setae, and entirely clothed with microtrichia. Virga also robust, composed of 6 codes 80 μm long. Inner lobe of gonocoxite large, nearly rectangular, and with many short setae. Gonostylus widest at about middle, both lateral and inner margins convex, without preapical tooth.

Remarks. These specimens are considered as belonging also to the genus *Eukiefferiella* in wider sense, and can be classified into the *tamaparvula* group,since R2+3 is separated from R4+5, eyes bare, and with a large anal point, and is related to *E. asamasecundus* (Sasa et Hirabayashi, 1991), in that DM are present, but the latter is essentially different from the present species in that anal point is small, triangular and bare, without such a robust virga, and gonostylus is not medially expapnded.

41. *Eukiefferiella yakusetea* sp. nov. (Figs. 32 a-i) Euk-S

A male, No.383:32, holotype, SWP at Yakusugi Land on March 25. BL 2.06mm, WL 1.30mm, WW/WL 0.32. Scutal stripes and postnotum brown, scutellum, legs and abdomen brownish yellow. Head in Fig. 32 a. Eyes bare, reniform, ER 1.45. Antenna with 13 flagellar segments, AR 0.47, AHR 0.41. P/H 0.92. SO 3:3, CL 6. Antepronotum (Fig. 32 b) very narrowly united, with 1:1 small setae. Bases of setae on scutum and scutellum in Fig. 32 c. DM 14, all minute, DL 4:5, PA 3:3, SC 4. Scutum with a pair of small humeral pits.

Wing in Fig. 32 d. Membrane bare, smooth, brownish. Squama bare. R2+3 in contact with R4+5, VR 1.28, R/Cu 0.97. Costa extending beyond tip of R4+5, but ending much proximal to tip of wing. Cu2 nearly straight. Tip of fore tibia (Fig. 32 e) with a long spur, tip of mid tibia (Fig. 32 f) with two short spurs, tip of hind tibia (Fig. 32 g) with a long and a

short spur, and a comb composed of 11 free spines. Tarsi I and II of mid and hind legs without terminal spur. fLR 0.73, mLR 0.48, hLR 0.58, fTR 0.14, fBR 3.3, mBR 4.0, hBR 5.3. Pulvilli absent.

Abdominal tergites (Fig. 32 h) with relatively small numbers of setae, 12 on I, 14 on II, 15 on III, 14 on IV, 13 on V, and 12 on VI to VIII. Hypopygium in Fig. 32 i. Anal point and virga absent. Inner lobe of gonocoxite longer than wide, posterior margin angulate. Gonostylus slender, slightly curved inwards near apex, without preapical swelling.

Remarks. This specimen belongs to the *yaraensis* group of genus *Eukiefferiella*, since R2+3 is in contact with R4+5, squamae and eyes are bare, and anal point is absent. It is closest to *E. kurobeangulata* Sasa et Okazawa, 1992, in that DM setae are present, but the latter differs from the present species at least in that AR is only 0.18, and fLR 0.46, mLR 0.38, hLR 0.48, all smaller than in the present species.

42. *Orthocladius* sp. "yakuteuus" (Figs. 33 a-i)

A male, No.382:94, LT in the town of Miyanoura on Mach 24. BL 3.54mm, WL 2.06mm, WW/WL 0.29. Scutal stripes and postnotum dark brown, other body portions largely brown. Head in Fig. 33 a. Eyes bare, both with a dorsomedial projection, ER 0.69. Antenna both lost from the 4th segment, but AR seems to be much higher than 1.0, because the basal segments are very short. P/H 1.03. SO 12:12, CL 6. Anteprponotum (Fig. 33 b) very narrowly united, with 4:3 lateral setae. Setae on scutum and scutellum (Fig. 33 c) all well developed, DM 22, DL 9:10, PA 5:5, SC 8.

Wing (Fig. 33 d) bare, squama with 18:18 fringe hairs, costa not produced beyond tip of R4+5, RR 0.36, VR 1.13, R/Cu 1.06. Cu2 nearly straight. Anal lobe produced inwards. Tip of fore tibia (Fig. 33 e) with a long spur, 60 μm. Tip of mid tibia (Fig. 33 f) with two short spurs, 30 and 32 μm long. Tip of hind tibia (Fig. 33 g) with a long (78 μm) and a short (32 μm) spur, and a comb composed of 14 free spines. Tips of tarsi I and II of mid legs and tip of tarsus I of hind legs each with 2 short spurs, other tarsal segments without terminal spur. Pulvilli absent. fLR 0.80, mLR 0.53, hLR 0.62, fTR 0.13, fBR 3.2, mBR 3.2, hBR 3.2.

Abdominal tergites with relatively large numbers of long setae, 74 on I and II, 70 on III and IV, and 60 on V to VIII. Hypopygium in Figs. 33 h,i. Anal point tapering towards sharply pointer apex, with 5 lateral setae on both sides, a typical structure of the subgenus *Orthocladius*. Ninth segment with a pair of peculiar, slightly sinuate dark ridge as internal structure near the posterior margin, a structure which has not been seen in the previously recorded species of this group. Inner lobe of gonocoxite single, longer than wide, smomewhat finger-like, with 10 marginal setae. Gonostylus widest near apex, inner margin slightly concave and without preapical swelling, with 5 conspicuous short setae on distal portion of inner margin.

Remarks. This specimen has the characters typical as a member of subgenus *Orthocladius*, especially in that eyes are bare and each with dorsomedial extension, thus ER is smaller than 1.0, setae on scutum and scutellum are well developed and the latter is only 8 in the number and arranged in a single transverse row, and in the structure of hypopygium,

especially in the shape of anal point, but is quite characteristic in that inner lobe of gonocoxite is single and longer than wide, and in having a pair of sinuate dark ridge in ninth segment. Therefore, this specimen seems to be representing a new species, but the scientific neme is reserved until additional specimens with complete antennae be collected.

43. *Psectrocladius (Monopsectrocladius) yakuuveus* sp. nov. (Figs. 34 a-i) Pse-U

Five males, No.381:10, SWP at Takenokawa River on March 23; 382:17,18, SWP at Issogawa River on March 24; No.383:17, SWP at Yakusugi Land on March 27, and 383:64, SWP at Anbou River on March 26. Holotype: No.382:17. Paratypes: other 4 males. BL 2.88-3.48 (3.18 in average of 6)mm, WL 1.62-2.12 (1.87)mm, WW/WL 0.27-0.31 (0.29). Scutal stripes and postnotum black, other body portions largely brown. Head in Fig. 34 a. Eyes bare, ER 1.36-1.50 (1.40). Antenna with 13 flagellar segments, AR 1.08-1.31 (1.18), AHR 0.52-0.61 (0.56). P/H 0.91-1.20 (1.02). SO 5-7 (6.2), CL 6-8 (7.0). Antepronotum (Fig. 34 b) deeply separated in the middle, with 8-12 (10.0) lateral setae. DM 8-16 (12.7), DL 9-16 (12.5), PA 5-8 (6.1), SC 6-12 (10.2), as in Fig. 34 c.

Wing (Fig. 34 d) bare, brownish, and granular. Squama with 7-16 (12.1) fringe hairs. Costa not extending beyond tip of R4+5. RR 0.46-0.55 (0.50), VR 1.10-1.20 (1.16), R/Cu 1.08-1.10 (1.09). Cu2 nearly stright. Tip of fore tibia (Fig. 34 e) with a long spur, 59 μm in the holotype, tip of mid tibia (Fig. 34 f) with two relatively long (both 48 μm) spurs, tip of hind tibia (Fig. 34 g) with a long (61 μm) and a short (42 μm) spur, and a comb composed of 16 free spines. Pulvilli large, brush-like (Fig. 34 h, hind tarsus V). fLR 0.57-0.64 (0.61), mLR 0.41-0.47 (0.44), hLR 0.55-0.58 (0.56), fTR 0.10-0.13, (11), fBR 2.8-6.1 (4.0), mBR 3.4-5.9 (4.7), hBR 3.1-6.4 (4.9).

Abdominal tergites with relatively large numbers of setae, 48 on I, 60 on II, 64 on III, 66 on IV 68 on V, 74 on VI, and 78 n VII and VIII in the holotype. Hypopygium in Fig. 34 i. Anal point half egg-shaped, with a distinct posterior line (a differentiating character from the flollowing species), bearing 16 strong sate. Virga composed of 2 codes 40 μm long. Gonocoxite with two inner lobes, the basal lobe very long, low and rounded, the distal lobe rounded, shorter and higher. Gonostypus conspicuously expanded at about basal 1/3.

Remarks. These specimens belong to the subgenus *Monopsectrocladius* Wuelker, 1995, of the genus *Psectrocladius* Kieffer, 1906, since the basic structure is the *Orthocladius* type, but large pulvilli are present and mid tibia with two terminal spurs, and is especially characteristic in the shape of anal point, inner lobe of gonocoxite and gonostylus, and such characters are quite similar to those of *P. fujigaprimus* Sasa, 1994 (ref. Fig. 65 A, Sasa and Kikuchi, 1995) recorded only once from Lake Fujigaike, Toyama, and the type specimens were rexamined this time, and in a conclusion, the present specimens are described as a differnt new species, since in the latter anal point is similar in structure but located more orally on ninth tergite, virga is absent, and inner lobe of gonocoxite is single and very low and broad.

44. *Psectrocladius (Monopsectrocladius) yakuveweus* (Figs. 35 a-i) Pse-V

A male, No.381:11, SWP at Takenokawa on March 23. BL 2.88mm, WL 1.62mm, WW/WL 0.31. Scutal stripes and postnotum dark brown, other body portions largely brown. Head in Fig. 35 a. Eyes bare, reniform, inner margin concave, ER 0.81 (relatively narrow). Antenna with 13 flagellar segments, AR 1.13, AHR 0.57. P/H 0.96. SO 2+3, 2+3, CL 6. Antepronotum (Fig. 35 b) united, with 3:3 lateral setae. DM 10, all minute, DL 15:12, PA 6:6, SC 6 (Fig. 35 c). Wing (Fig. 35 d) bare, conspicuously granular and bluish, costa extended much beyond tip of R4+5. Tip of fore tibia (Fig. 35 e) with a long spur, tip of mid tibia (Fig. 35 f) with two short spurs, tip of hind tibia (Fig. 35 g) with a long and a short spur, and a comb composed of 12 free spines. Tarsi without terminal spurs. Pulvilli large, brush-like (Fig. 35 h, hind tarsus V).

Setae on abdominal tergites are 22 on I, 44 on II and III, 56 on IV, 62 on V and VI, 58 on VII, and 52 on VIII. Hypopygium in Fig. 35 f. Anal point low, broad and rounded, with anterior borderline as in the previous species, with 16 short and stout setae. Virga composed of 8 codes 48 μm long. Inner margin of gonocoxite single, broad and posterior margin acutely angulate. Gonostylus with convex inner and lateral margins and widest at about middle.

Remarks. This specimen is quite similar in the structure and measurement data to the above spepcies, especially in the characters of anal point and gonostylus, but is considered as belonging to a different species, since antepronotum is united in the middle and with fewer setae, and wing membrane is more bluish in color, more conspicuously granular, costa is extended beyond tip of R4+5, and inner lobe of gonocoxite is single, narrower, and with angulate posterior margin.

45. *Psectrocladius (Monopsectrocladius) yakuwexeus* sp. nov. (Figs. 36 a-i) Pse-W

Two males, No.382:25, holotype, and No.382:26, paratype, both SWP at Issogawa River on March 24. BL 2.68, 2.62mm, WL 1.50, 1.47mm, WW/WL 0.31, 0.31. Scutal stripes and postnotum brown, other body portions largely yellowish brown. Head in Fig. 36 a. Eyes bare, reniform, ER 1.02, 1.04. Antenna with 13 flagellar segments, AR 0.94, 0.96, AHR 0.48, 0.49. P/H 1.00, 0.86. SO 8:9, 8:8, CL 5, 4. Antepronotum (Fig. 36 b) narrowly united, with 3:2, 4:5 lateral setae. DM 8, 8, DL 12:12, 14:14, PA 7:6, 8:6, SC 11, 10.

Wing (Fig. 36 d) bare, membrane plain, slightly brownish, costa extended beyond tip of R4+5. SQ 4:4, 6:6. RR 0.44, 0.43, VR 1.17, 1.17, R/Cu 1.04, 1.10. Cu2 nearly straight. Tip of fore tibia (Fig. 36 e) with a long spur, tip of mid tibia (Fig. 36 f) with two short spurs, tip of hind tibia (Fig. 36 g) with a long, and a short spur, and a comb composed of 12 free spines. fLR 0.72, 0.73, mLR 0.45, 0.48, hLR 0.62, 0.59, fTR 0.15, 0.15, fBR 2.8, 3.3, mBR 5.4, 3.4, hBR 5.5, 6.0. Pulvilli very large, brush-like (Fig. 36 h, tarsus V).

Setae on abdominal tergites are 30 on I, 40 on II, 48 on III and IV, 50 on V, 60 on VI, 54 on VII and 50 on VIII. Hypopygium in Fig. 36 i. Anal point very broad and low, situated in the middle of ninth tergite, with 15 short and stout setae, and without anterior borderline. Inner lobe of gonocoxite broad and low, with zig-zag margin, bearing 10:12 short and stout

setae. Gonostylus long, narrow, inner margin conspicuously concave.

Remarks. These specimens are considered also as belonging to the subgenus *Monopsectrocladius* of the genus *Psectrocladius* in the basic stricture, and to a new species, especially in view of the prvuliar structure of anal point and inner lobe of gonocoxite.

46. *Psectrocladius (Monopsectrocladius) yakuxeyeus* sp. nov. (Figs. 37 a-j)

Seven males were collected and identified, No.383:19, SWP at Yakusugi Land on March 25, No.383:65, SWP at Anbou River on March 26, No.384:37-41, SWP at Shirotani River on March 27. BL 2.94-3.38 (3.16 in average of 7)mm, WL 1.49-1.72 (1.61)mm, WW/WL 0.32-0.35 (0.33). Scutum and postnotum black, scutellum, legs and abdominal tergites brown. Head in Fig. 37 a. Eyes bare, reniform, ER 0.97-1.07 (mean 1.02). Antenna with 13 flagellar segments, AR 0.71-0.73 (0.72, relatively small), AHR 0.43-0.44 (0.44). P/H 0.97-1.23 (1.12). SO 8-12 (10.4), CL all 8. Antepronotum (Fig. 37 b) united, PN 5-9 (7.3). Scutum and scutellum in Fig. 37 c; DM 12-16, all minute, DL 18-26 (23.0), PA 8 or 10 (9.5), SC 16-20 (18.5).

Wing (Fig. 37 d) bare, brownish, membrane not granular but smooth. Squama with 10-18 (13.1) fringe hairs. Costa conspicuously extended beyond tip of R4+5. R2+3 separated, RR 0.59-0.66 (0.62). VR 1.22-1,23), R/Cu 1.09-1.11 (1.10). Cu2 nearly straight. Tip of fore tibia (Fig. 37 e) with a long (49 μm) spur, tip of mid tibia (Fig. 37 f) with two short (20 and 28 μm) spurs, tip of hind tibia (Fig. 37 g) with a long (56 μm) and a short (26 μm) spur, and a comb composed of 12 free spines. fLR 0.65-0.66, mLR all 0.46, hLR 0.54-0.57 (0.55), fTR 0.14-0.15, fBR 2.2-2.5 (2.4), mBR 2.8-3.2 (3.0), hBR 3.4-5.2 (4.3). Pulvilli large, brush-like (not pad-like as in most *Psectrocladius* species).

Abdominal tergites (Fig. 37 i, right half) with relatively large numbers of setae, 60 on Ⅰ, 64 on Ⅱ, 74 on Ⅲ, 73 on Ⅳ, 68 on Ⅴ, 60 on Ⅵ and Ⅶ, and 56 on Ⅷ. Hypopygium in Fig. 31 j. Anal point low, broad and rounded,with 15 short and stout setae, anterior borderline absent. Virga absent. Inner lobe of gonocoxite small and rounded. Gonostylus simple, inner margin nearly straight and widest at about middle.
Very narrow, and conspicuously curved inwards at about distal 1/3.

Remarks. This species also belongs to the subgenus *Monopsectrocladius* Wuelker, 1956, of the genus *Psectrocladius* Kieffer, 1906, and is related to *P. turfaceus* Kieffer in that anal point is very low, broad and bearing short but strong setae.

Key to species of *Monopsectrocladius* collected on Yaku Island

A total of 15 specimens collected on Yaku Island were diagnosed as belonging to subgenus *Monopsectrocladius* of the genuss *Psectrocladius,* since they show basic characters as in the *Orthocladius* group and pulvilli are large and brush-like, and mid tibia with two terminal spurs. They are furher classified into the following 4 species as in the next key.

1- Antepronotum deeply separated in the middle, wing slightly granular and bluish, costa not extended beyond tip of R4+5; anal point low, broad and rounded, with anterior borderline; virga composed of two narrow codes; gonocoxite with two inner lobes; gonostylus very broadly expanded in the middle portion; AR 1.08-1.31, fLR 0.57-0.64 Pse-U

- Antepronotum united in the middle; gonostylus not expanded in the middle portion; costa extended beyond tip of R4+5 2

2- Anal point with anterior borderline; wing membrane conspicuously granular; inner lobe of gonocoxite single, long, low and posterior corner sharply angulate; AR 1.13, fLR 0.64 Pse-V

- Anal point low, broad and without anterior borderline; wing membrane plain 3

3- AR 1.00-1.0.5, fLR 0.72-0.73, both higher; inner lobe of gonocoxite with zigzag margin; inner margin of gonostylus strongly concave Pse-B

- AR 0.71-0.75, fLR 0.63-0.69, both lower; inner lobe of gonocoxite with smoothy rounded margin; gonostylus slender and nearly straight Pse-C

47. *Limnophyes minimus* (Meigen, 1818) (Figs. 38 a-m) Lim-M

A total of 26 males were identified as slide-mounted specimens; No.381:17-21, 30-34, SWP at Takenokawa on March 23; No.381:35,36, 63,65,66, SWP at Nagata on March 23; No.382:30,33, SWP at Issogawa on March 24, No.382:64, 71-774, SWP at Miyanoura River on March 24; No.383:55-59, SWP at Yakusugi Land on March 25; No.383:66, SWP at Anbougawa River on March 26.. BL 1.79-2.08 (1.89 in average of 10)mm, WL 0.89-1.09 (0.96)mm, WW/WL 0.32-0.36 (0.34, very wide). Scutal stripes and postnotum dark brown, other scutal portiuon and scutellum yellow, legs and abdominal tergites brownish yellow. Head in Fig. 38 a. Eyes bare, reniform, ER 1.17-1.37 (1.28). Antenna with 10, 11 or 12 flagellalr segments, AR 0.37-0.51 (0.44), AHR 0.31-0.50 (0.41). Palp short, P/H 0.67-0.78 (0.73). SO composed of 1-2 inner and 2 or 3 lateral groups. CL 10-16 (13.0). Antepronotum (Fig. 38 b) slightly separated, with 1 dorsal and 2 or 3 lateral setae. Setae on scutum and scutellum in Fig. 38 c. DM all 0, DL 13-18 (14.6), PA 5-8 (6.4), SC 4-7 (5.3).

Wing (Fig. 38 d) bare, highly granular and bluish, squama with 1 or 2 (1.6) fringe hairs. RR 0.32-0.45 (0.38), VR 1.26-1.44 (1.35), R/Cu 1.00-1.05 (1.02). Cu2 short and strongly sinuate. Tip of fore tibia (Fig. 38 e) with a long spur, tip of mid tibia (Fig. 38 f) with 2 short spurs, tip of hind tibia (Figs. 38 g,h) with a long and a short spur, and a comb composed of some 8 spurs. Pulvilli absent. fLR 0.49-0.51 (0.50), mLR 0.42-0.47 (0.44), hLR 0.52-0.59 (0.55), fTR 0.12-0.15 (0.13)), fBR 1.2-2.4 (1.8), mBR 1.8-3.0 (2.4), hBR 2.4-3.0 (2.7).

Abdominal tergites (Fig. 38 i) with small numberrs of setae, 12 on Ⅰ, 14 on Ⅱ, 18 on Ⅲ, 20 on Ⅳ and Ⅴ, and 16 on Ⅵ to Ⅷ in specimen 383:59. Hypopygium in Fig. 38 j. Anal point absent, ninth tergite slightly produced backwards in the middle and with numerous marginal setae and microtrichia (Fig. 38 k). Virga prominent, composed of 2 stout codes 20 μm long situated on a cup. Inner lobe of gonocoxite (also in Fig. 38m) acutely angulate and with short setae and micortrichia. Gonostylus (also in Fig. 38m) nearly straight and parallel-sided, with a small preapical tooth.

Remarks. This is the type spepcies of *Limnophyes*, and has been recorded nearly all over the world, and also from many localities of Japan, and has been collected very commonly at least at six different sites on this island. The above rather detailed description is made in order to compare with the additional 5 species of apparently the same genus col-

lected on this island. They are common in that the basic structures are typical as members of the subfamily Orthocladiinae, and wing membrane is highly granular and bluish, but show a variety of differences in the structures of especially the tip of mid tibia and hypopygium, and are an interesting example of studying the evolution of species within a genus.

48. *Limnophyes yakyabeus* sp. nov. (Figs. 39 a-j) Lim-A

A male, No.381:22, SWP at Takenokawa on March 24. BL 1.82mm, WL 0.95mm, WW/WL 0.34. Scutum and postonotum brown, scutellum legs and abdominal tergites yellowish brown. Head in Fig. 39 a. Eyes bare, oval, without dorsomedial projection, ER 1.37. Antenna with 11 flagellar segments, AR 0.63, AHR 0.51. Palp short, P/H 0.75. SO 1+3, CL 13. Antepronotum (Fig. 39 b) united, with 1:1 dorsal and 2:2 lateral setae. Scutum and scutellum in Fig. 39 c; DM 0, DL 9:10, the pair of most posterior setae (also in Fig. 39 d) are long (34 μm) and foliate, other DL setae are simple. PA 4:4, SC 4.

Wing (Fig. 39 e) bare, highly granular and bluish, squama with 1:1 fringe hair. RR 0.39, VR 1.30, R/Cu 1.02. Cu2 strongly curved. Tip of fore tibia (Fig. 39 f) with a long spur, tip of mid tibia (Fig. 39 g) with two short spurs, tip of hind tibia (Fig. 39 h) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.50, mLR 0.47, hLR 0.59, front tarsus V both lost, fBR 1.3, mBR 3.0, hBR 3.0. Pulvilli vestigial.

Abdominal tergites with relatively small numbers of setae, 12 on I, 14 on II, 16 on III, 18 on IV and V, 20 on VI, and 18 on VII and VIII. Hypopygium in. Fig. 39 i, right inner lobe and gonostylus in Fig. 39 j. Anal point low, broad and rounded. Virga composed of 4 stout codes. Inner lobe of gonocoxite acutely angulate. Gonostylus nearly straight but apically expanded, without megaseta, and with a small hole on dorsolateral side near apex.

Remarks. This specimen is a typical member of genus *Limnophyes* in the basic structure, but is quite unusual in that the pair of dorsolateral setae situated most posteriorly is long and foliate (Figs. 39 c,d), anal point is broad and rounded, inner lobe of gonocoxite is rather narrow and acutely angulate, and gonostylus is nearly straight but apically expanded and without megaseta.

49. *Limnophyes yakybeceus* sp. nov. (Figs. 40 a-i) Lim-B

Four males; No.382:34, SWP at Isso on March 24; No.383:68, SWP at Anbokawa on March 26; No.386:18,19, LT in the town of Miyanoura on March 28. Holotype: No.386:18, paratypes, other 3 males. BL 1.78, 1.46, 1.64, .82mm, WL 0.93, 0.94, 0.98, 0.96mm, WW/WL 0.30, 0.30, 0.29, 0.30. Scutum and postnotum brown, legs and abdomen yellowish brown. Head in Fig. 40 a. Eyes bare, reniform, ER 1.06, 1.22, 1.40, 1.29. Antenna with 12 flagellar segments, AR 0.62, 0.43, 0.60, 0.81, AHR 0.54, 0.42, 0.52, 0.54. P/H 0.82, 0.72, 0.88, 0.81. SO 7:7, 7:8, 8:8, 8:10, CL all 4. Antepronotum (Fig. 40 b) wedely separated, with 2:2, 2:2, 2:2, 3:3 lateral setae, dorsal seta all absent. Setae on scutum and scutellum in Fig. 40 c; DM 18, 11, 14, 12, DL 15:16, 9:8, 13:14, 11:12, PA 8:8, 6:6, 8:8, 6:5, SC 4, 4, 2, 4.

Wing (Fig. 40 d) bare, bluish and highly granular. Squama all bare. RR 0.71, 0.70, 0.73, 0.79, VR 1.35, 1.37, 1.33, 1.33, R/Cu 1.3, 1.00, 1.02, 1.05. Tip of fore tibia (Fig. 40 e) with

a long spur, tip of mid tibia (Fig. 40 f) with two short setae but without spurs (quite unusual structure), tip of hind tibia (Fig. 40 g) with a long spur but without a short spur, and a comb composed of 10 free spines. fLR 0.47, 0.48, 0.44, mLR 0.45, 0.43, 0.46, 0.46, hLR 0.62, 0.60, 0.58, 0.61, fTR 0.16, 0.13, 0.15, 0.17, fBR 1.8, 1.6, 1.4, 1.4, mBR 2.4, 1.6, 2.9, 1.8, hBR 2.6, 1.8, 3.0, 3.0.

Abdominal tergites (Fig. 40 h) with relatively small numbers of setae, 10 on Ⅰ, 16 on Ⅱ to Ⅷ in the holotype, and those on Ⅱ to Ⅵ are arranged into the anterior and the posterior transverse rows. Hypopygium in Fig. 40 i. Anal point absent, ninth tergite with a pair of low and broad lobes bearing some 10 strong setae. Virga long, composed of 4 codes 38 μm long. Gonocoxite with a transverse row of 5 long setae near the base of the large cavity accepting gonostylus, without inner lobe but with a large, triangular and darkly pigmented basal lobe (right side lobe is shown by dotted markings in Fig. 40 i) which is continuous to the baseline of the cavity, and are situated under the ninth tergite, and largely bare but with one long apical seta, a peculiar structure. Gonostylus is also peculiar in the structure, with a large rounded preapical tooth.

Remarks. These 4 specimens have the basic structure typical as members of genus *Limnophyes,* and belongs to the group without foliate setae among DL, but is ususual in that antepronotums are widely separated and without dorsal seta, the numbers of DL setae are rather high as a member of this group, the two terminal spurs usually present on the tip of mid tibia and the shorter spurs on the tip of hind tibia are absent, squamae are bare and vein Cu2 is very short and not curved, ninth tergite without anal point and with a pair of low and broad lobes bearing some 10 stout setae, gonocoxite with 5 long setae in a transverse row in the base of the cavity on dorsal side, without inner lobe and with a darkly pigmented quadrangular lobe bearing only one apical seta, and gonostylus with a prominent preapical tooth, most of which are not see in the previously described species of this goup.

50. *Limnophyes yakycedeus* sp. nov. (Figs. 41 a-j) Lim-C

Four males; No.383:69, holotype, SWP at Anboukawa on March 26; paratypes, No.382:29, No.382:47, 48, SWP in the town of Miyanoura on March 28 and 29. BL 1.86-2.22 (1.97 in average of 4)mm, WL 0.94-1.00 (0.97)mm, WW/WL 0.33-0.36 (0.34). Head in Fig. 41 a. Eyes bare, inner margin nearly straight, ER 1.17-1.43 (1.33). Antenna with 11 flagellar segments, AR 0.41-0.46 (0.44), AHR 0.34-0.40 (0.37). Palp short, P/H 0.71-0.91 (0.79). SO composed of 0-2 inner and 2-4 lateral groups, CL 13-16 (14.3). Antepronotum (Fig. 41 b) united, with 1 (in 3) or 2 upper and 2 (in 2) or 3 lateral setae. Setae on scutum and scutellum in Fig. 41 c; DM all 0. DL 17-24 (20.0, very many), and 4 or 5 in humeral areas (Fig. 41 i, about 35 μm long) and 4-6 in prescutellar areas (Fig. 41 j, about 36 μm) are foliate. PA 5-7 (6.0), SC all 6. Scutum with a pair of darkly pigmented D-shaped processes surrounded by foliate setae in the humeral areas (Fig. 41 d) .

Wing membrane highly granular and bluish, venation in Fig. 41 d. Squama all bare. Costa extended much beyond tip of R4+5, RR 0.35-0.48 (0.44), VR 1.24-1.32 (1.29), R/Cu 1.00-1.05 (1.03). Cu2 short and strongly curved. Anal lobe nearly flat. Tip of fore tibia (Fig.

41 e) with a long spur (49 μm), tip of mid tibia (Fig. 41 f) with two short spurs (both 20 μm), tip of hind tibia (Fig. 41 g) with a long and a short spur, and a comb composed of 9 free spines. fLR 0.48-0.51 (0.49), mLR 0.44-0.46 (0.45), hLR 0.57-0.61 (0.58), fTR 0.12-0.13, fBR 1.6-3.2 (2.2), mBR 2.3-2.6 (2.5), hBR 2.4-3.0 (2.7). Pulvilli absent.

Setae on abdominal tergites are small in the numbers and almost randomly distributed, 18 on I, 20 on II and III, and 24 on IV to VIII in the holotype. Hypopygium in Fig. 41 h. Ninth tergite with a broad and rounded anal-point like process on the posterior margin, bearing 6 short setae and microtrichia on entire surface, with an oral borderline. Gonostylus broad at base, with a conspicuous inner lobe, nearly as long as wide and rounded, bearing 5 short setae and entirely clothed with microtrichia. Gonostylus nearly straight, with a small preapical swelling, and with a megaseta.

Remarks. This species has the basic structure typical as a member of genus *Limnophyes*, and belongs to the group with megaseta on gonostylus, but is quite characteristic in that dorsolateral setae contain foliate setae on both humeral and prescutellar areas, and thus resembles to *L. akanangularius* Sasa et Kamimura, 1987, which was collected from a lake in Hokkaido, especially in that antenna with 11 flagellar segments and AR is about 0.5, but differs essentially in that the present species has an anal-point like process on posterior margin of ninth tergite, inner lobe of gonocoxite is rounded (acutely pointed in *L. akanangularius*), and DM setae are absent (4 or 5 in the latter).

51. *Limnophyes yakydeeus* sp. nov. (Figs. 42 a-j) Lim-D

A male, holotype, No.383:15, SWP at Yakusugi Land on March 25. BL 3.29mm, WL 2.12mm (both very large), ww/WL 0.27 (very narrow). Scutal stripes, postnotum and abdominal tergites yellowish brown, other scutal areas, scutellum and legs yellow. Head in Fig. 42 a. Eyes bare, inner margin concave, ER 0.77 (very narrow as a *Limnophyes*). Atenna with 13 flagellar segments, AR 1.10, AHR 0.55. Palp short, P/H 0.90, SO 9:9, CL 4. Antepronotum (Fig. 42 b) united, without dorsal seta and with 3:3 lateral setae. Scutum and scutellum in Fig. 42 c; DM 0, DL 10:11, PA 4:2, SC 6.

Wing (Fig. 42 d) bare, highly granular, squama with 1:1 fringe seta, costa much extended beyond tip of R4+5. RR 0.40, VR 1.32, R/Cu 1.20. Cu23 relatively long and nearly straight. Tip of fore tibia (Fig. 42 e) with a long and barbed spur, tip of mid tibia (Fig. 42 f) with only one spur, tip of hind tibia (Fig. 42 g) with a long and a short spur, and a comb composed of 17 (very many) free spines. fLR 0.76, mLR 0.67 (very high), hLR 0.60, fTR 0.11, fBR 2.8, mBR 2.2, hBR 2.7. Pulvilli absent.

Abdominal tergites with lalrge numbers of setae, 36 on I, 42 on II and III, 48 on IV, 56 in V ti VII, and 54 on VIII. Hypopygium in Fig. 42 h. Anal point (also in Fig. 42 i) almost as wide as long and rounded, entirely clothed with microtrichia and surrounded by short setae. Virga small, composed of 6 codes 20 μm long. Inner lobe of gonocoxite (also in Fig. 42 j) broad and rounded, situated near the base, clothed with short setae and microtrichia. Gonostylus simple, nearly parallel-sided, with a megaseta, but without preapical swelling.

Remarks. This specimen has the basic structures as a member of *Limnophyes*, especially in that wing membrane is granular and bluish, but is quite unusual as a member of this genus in that body and wings are large, ER small, antenna with 13 flagellar segments and AR is larger than 1.0, antepronotum without dorsal setae, wing vein Cu2 is nearly straight, and anal point and inner lobe of gonocoxite are broad and rounded.

52. *Limnophyes yakyefeus* sp. nov. (Figs. 43 a-h) Lim-E

A male, No.383:18, SWP at Yakusugi Land on March 25. Body large, BL 3.66mm, WL 2.14mm, wing very narrow, WW/WL 0.27. Scutal stripes, postnotum and abdomen brown, other scutal areas, scutellum and legs yellow. Head in Fig. 43 a. Eyes bare, with a prominent dorsomedial projection, ER 0.66. Antenna with 13 flagellar segments, AR 1.08, AHR 0.56. P/H 0.87. SO 8:8, CL only 3. Antepronotum (Fig. 48 b) united, without dorsal setae and with 3:4 lateral setae. DM 0, DL 9:10, PA 3:3, SC 4 (Fig. 43 c).

Wing (Fig. 43 d) bare, membrane highly granular and bluish. Squama with 3:1 fringe hairs, RR 0.42, VR 1.28, R/Cu 1.10. Costa extended much beyond tip of R4+5. Cu2 conspicuously curved at about middle. Tip of fore tibia (Fig. 43 e) with a long spur, 77 μm, tip of mid tibia (Fig. 43 f) with 2 spurs, 29 and 43 μm long, but without comb, tip of hind tibia (Fig. 43 g) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.73, mLR 0.58, hLR 00.58, all very high. Fore arsus V both lost, fBR 2.8, mBR 3.2, hBR 3.2. Pulvilli absent.

The numbers of setae on abdominal tergites are 28 on I, 36 on II and III, 44 on IV, 52 on V and VI, and 48 on VII and VIII. Hypopygium in Fig. 43 h. Anal point absent, but ninth tergite with a low and rounded lobe in the middle of posterior margin, bearing short setae and entirely clothed with microtrichia. Inner lobe of gonocoxite absent. Gonostylus widest near the tip and inner margin slightly concave, with a megaseta, but without preapical swelling.

Remarks. This specimen is also provisionally classified as a member of genus *Limnophyes*, since wing membrane is conspicuously granular, squama bare, costa extended, tip of R4+5 distal to tip of Cul, and Cu2 is curved, but is characteristic in that body and wings are large, eyes with a dorsomedial extension and ER is much smaller than 1.0, with a broad and rounded anal lobe, gonocoxite without inner lobe, and gonostylus with a megaseta and widest near apex.

A key to species of adult males of Genus *Limnophes* collected on Yaku Island

Eight species among the chironomids collected on Yaku are provisionally classified into the genus *Limnophyes*, which can be differntiated by the following key.

1- Body small, BL 1.4-2.2mm, WL 0.89-1.03mm; WW/WL 0.30-0.36; antenna with 10-12 flagellar segments, AR 0.37-0.63; ER 1.06-1.46; fLR 0.44-0.51, mLR 0.42-0.47, hLR 0.52-0.62 (Lim-gr. Small) 2

- Body large, BL 3.0-3.7mm, WL 1.82-2.16mm; WW/WL 0.27-0,30; antenna with 13 flagellar segments, AR 1.04-1.21; ER 0.66-0.77; fLR 0.67-0.76, mLR 0.55-0.67, hLR 0.60-0.70 (Lim-gr.

Large) 5

2- Ninth tergite with an anal-point like, low, broad and rounded lobe near posterior margin, bearing many short setae and microtrichia; some of the DL setae on scutum are broad and foliate; DM absent 3

- Ninth tergite without a lobe; DL setae are all long and simple, none of them are foliate 4

3- Only 1 DL seta situated most posteriorly in prescutellar area is foliate; virga composed of 4 stout codes, 18 μm long, situated on a cup; SQ ? 0; inner lobe of gonocoxite acutely angulate; gonostylus without megaseta Lim-A

- More than 2 humeral and prescutellar DL setae are foliate; virga composed of a single code 30 μm long; SQ 2; inner lobe of gonocoxite nearly rectangular; strong metaseta present on the tip of gonostylus Lim-C

4- Gonocoxite without inner lobe, and a strong, angularte and darkly pigmented lobe almost bare basal lobe with an apical seta; scutum with 11-18 DM setae; gonostylus widest at about basal 1/3, apically slightly expanded, and with an obtuse preapical tooth Lim-B

- Gonocoxite with a characteristic angulate inner lobe bearing numerous shorot setae and microtrichia, but without basal lobe; DM setae absent; gonostylus widest near apex, without preapical tooth *L. minimus* (Meigen)

5- Distinct anal point present, long, narrow, bare and apically pointed; virga absent; tip of mid tibia with tow terminal spurs, and a comb composed of 5-9 free spines, like in those on the tip of hind tibia in related species; squama bare; inner lobe of gonocoxite prominent and nearly quadrangular; virga absent Lim-E

- Distinct anal point absent 7

7- Ninth tergite with a broad and rounded median lobe bearing short setae and microtrichia; tip of mid tibia without a comb 8

- Ninth tergite without median lobe on the posterior margin; SQ 0; tip of mid tibia with 2 spurs, and a comb composed of 6 free spines; gonostylus very wide in the middle Lim-G

8- Inner lobe of gonocoxite present, though low and broad; tip of mid tibia with only one terminal spur Lim-D

- Inner lobe of gonocoxite absent; tip of mid tibia with 2 spurs, as usual; Lim-F

A key for classification of *Limnophyes* species
Collected on Yaku Island by the structure of the tip of mid tibia.

1- Tip of mid tibia without spurs and comb spines Lim-B

- Tip of mid tibia with 1 or 2 spurs 2

2- Tip of mid tibia with 1 spur Lim-D

- Tip of mid tibia with 2 spurs 3

3- Tip of mid tibia without comb spines Lim-M, Lim-A, Lim-C, Lim-F

- Tip of mid tibia with several comb spines Lim-E, Lim-G

Lim-E and Lim-G are separated by the presence of a large, long and bare anal point in the former, and the absence of anal point in the latter.

Note. The species differentiation of this genus collected this time from Yaku, and their mode of distribution, have presented very interesting and important information on the taxonomy and ecology of this groupp of Chironomidae. It included a large number of *L. minimus*, the type species of this genus with cosmopolitan distribution, but the other 7 species have not been collected prpeviously and all described as new spepcies, and seem to have evolved into males with a variety of different new morphological characters. Especially interesting is that they could be classified into the two groups with body size, and the values of measurement data such as AR, ER and LR. The species of the larger group are all new to us.

53. *Okinawayusurika yakyfegeus* sp. nov. (Figs. 44 a-i)

Three males; No.383:16, holotype, SWP at Yakusugi Land on March 25; No.386:17, paratype, LT in the town of Miyanoura on March 28; No.381:03, SWP at Takenogawa River on March 23. Relatively large species, BL 3.08, 3.14mm, WL 1.82, 1.92mm, WW/WL 0.29, 0.30 (relatively narrow). Scutal stripes and postnotum brown, other scutel areas and scutellum pale, legs and abdominal tergites brownish yellow. Head in Fig. 44 a. Eyes bare, each with a long dorsomedial projection (quite different from most other *Limnophyes* species), ER 0.70, 0.71 (very small). Antenna with 13 flagellar segments, 1.21, 1.12, 1.22, AHR 0.57, 0.54, 0.56. P/H 1.00, 1.00. 1.13, SO 9:9, 12:12, 9:9, CL 4, 6, 3 (very small). Antepronotum (Fig. 44 b) slightly separated, without dorsal seta and with 2:2, 3:3, 3:3 lateral setae. Setae on scutum and scutellum in Fig. 44 c; DM 6, 10, 8, DL 11:10, 10:11, 9:9, PA 6:6, 6:6, 5:5, SC 8, 7, 8.

Wing (Fig. 44 d) bare, bluish and conspicuously granular, squama bare. RR 0.53, 0.44, 0.42, VR 1.18, .26, 1.17, R/Cu 1.12, 1.12, 1.07. Costa extended beyond tip of R4+5, Cu2 long and nearly straight (an unusual character as a member of *Limnophyes*). fLR 0.76, 0.75, 0.79, mLR 0.55, 0.54, 0.54 (unusually high), hLR 0.64, 0.60, 0.63, fTR 0.13, 0.12, 0.14, fBR 2.1, 1.9, 3.2, mBR 2.8, 2.4, 3.4, hBR 3.1, 3.0, 3.6. Tip of fore tibia (Fig. 44 e) with a long spur, tip of mid tibia (Fig. 44 f) with two short spurs, and a comb composed of 5:5, 8:9, 8:7 free spines (a quite unusual structure). Tip of hind tibia (Fig. 44 g) with a long and a short spur, and a comb composed of 12:12, 15:15, 14:14 free spines. Pulvilli vestigial (Fig. 44 h, hind tarsus V).

Abdominal tergites with relatively large numbers of setae, 48 on I, 52 on II, 60 on III, 84 on IV and V, 76 on VI, 72 on VII, and 70 on VIII in the holotype. Hypopygium in Fig. 44 h. Anal point long, bare and tapering towards pointed apex. Ninth tergite with 9 setae near its base, virga absent. Inner lobe of gonocoxite nearly as long as broad, and almost quadrangular. Gonostylus nearly straight and widest near apex, with a large megaseta but without preapical swelling.

Remarks. This species is provisionally included in the genus *Limnophyes* since wing membrane is highly granular and bluish, but is quite unusual as a member of this genus in that body size is very large, wing vein Cu2 is nearly straight, mid tibia with a terminal comb such as seen in hind tibia of most other species of this group, and has a long, bare, narrow and apically pointed anal point.

54. *Okinawayusurika yakygeheus* sp. nov. (Figs. 45 a-j)

A male, holotype, No.383:20, SWP at Yakusugi Land on March 25. Median stripes brown, lateral stripes and postnotum dark brown, scutellum and legs yellowish brown, abdominal tergites brown. BL 2.66mm, WL 1.61mm, WW/WL 0.29. Head in Fig. 45 a. Eyes bare, reniform, ER 0.67. Antenna with 13 flagellar segments, AR 1.45, AHR 0.58. Palp short, P/H 0.75. SO 10:10, CL 8. Antepronotum (Fig. 45 b) united, with 4:5 lateral setae. Setae on scutum and scutellum in Fig. 45 c; DM 16, all minte, DL 18, 17, PA 8:9, SC 10.

Wing (Fig. 45 d) bare, highly granular and bluish, squama with 3:1 fringe hairs, costa extended beyond tip of R4+5. RR 0.46, VR 1.26, R/Cu 1.08. Cu2 nearly straight. Tip of fore tibia (Fig. 45 e) with a long spur, tip of mid tibia (Figs. 45 f,g) with two spurs, and a comb composed of 5 free spines, tip of 14 free spines. fLR 0.67, mLR 0.57, hLR 0.59, all very high. Fore tarsus V both lost, fBR 02.3, mBR 3.4, hBR 4.2. Pulvilli vestigial.

Numbers of setae on abdominal tergites are relaltively large, 36 on I, 52 on II, 58 on III, 64 on IV and V, 62 on VI and VII, and 54 on VIII. Hypopygium in Figs. 45 i,j. Anal point absent, ninth tergite with 10 short setae in the middle portion. Virga (in Fig. 45 j) small, composed of codes 27 μm long. Inner lobe of gonocoxite very small, low and rounded. Gonostylus widest at about distal 1/3, with a megaseta but without preapical swelling.

Remarks. This species belongs also to the large group of *Limnophyes* collected on Yaku, with wings highly granular and bluish, AR 1.45 (very high), fLR 0.67, mLR 0.57, hLR 0.59 (LR all high), and is characterized by that DM are 18 (very many), Cu2 long and nearly straight, tip of mid tibia with a comb like in that of hind tibia, anal lobe is absent, inner lobe of gonocoxite is small and rounded, and gonostylus is widest at about distal 1/3.

55. *Metriocnemus togamirus* Sasa, Watanabe et Arakawa, 1992 Met-T

A male, No.384:57, LT at Anbo, on March 27. BL 3.04mm, WL 1.86mm, WW/WL 0.31. Eyes bare, ER 0.90. AR 1.43, AHR 0.54, P/H 1.09. SO 10:12, CL 10, PN 6:6. DM 6, DL 23:20, PA 7:9, SC 24. Wing entirely clothed with macrotrichia, SQ 9, RR 0.43, VR 111, R/Cu 1.10. fLR 0.73, mLR 0.47, hLR 0.57, fTR 0.12, fBR 2.4, mBR 0.40, hBR 3.2. All legs with a pair of large brush-like pulvilli. Hypopygium as described in the original paper (Sasa, Watanabe & Arakawa, 1992, p.232, and in Sasa & Kikuchi, 1995, Fig. 72 G). This species was originally collected at Toga, Toyama, and later also at Kamikochi, Nagano, a valley in Japan Alps, by Sasa & Hirabayashi (1993).

56. *Metriocnemus yakyheius* sp. nov. (Figs. 46 a-j) Met-H

A male, holotype, No.384:07, SWP at Shiratani River, on March 27. A small specimen, BL 2.68mm, WL 1.50mm, WW/WL 0.32. Scutal stripes and postnotum brown, scutellum, legs and abdomen yellow. Head in Fig. 46 a. Eyes bare, with conspicuous dorsomedial extension, ER 0.63. Antenna with 13 flagellar segments, AR 0.66, AHR 0.41. P/H 1.05. SO 8:8, CL 6. Antepronotum (Fig. 46 b) very narrowly united, with 8:8 lateral setae. Scutun and scutellum in Fig. 46 c; DM 12, DL 13:14, PA 7:7, SC 6.

Wing (Fig. 46 d) membrane entirely clothed with macrotrichia, R4+5 in contact with

R4+5, VR 1.14, R/Cu 1.05. Cu2 slightly curved near thip. Tip of fore tibia (Fig. 46 e) with a long spur, tip of mid tibia with (Fig. 46 f) two short spurs, tip of hind tibia (Fig. 46 g) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.67, mLR 0.56, hLR 0.70, fTR 0.14, fBR 2.4, mBR 2.5, hBR 4.2. Tip of mid and hind tarsi I and II without terminal spurs. Pulvilli absent (Fig. 46 h, hind tarsus V).

Setae on abdominal tergites in Fig. 46 i, 10 on I, 28 on II and III, 32 on IV, 36 on V, 32 on VI, and 28 on VII and VIII. Hypopygium in Fig. 46 j. Anal point composed of a very large and wide basal portion bearing 12 lateral setae and entirely clothed with microtrichia, and a bare paprallel-sided distal horn with rounded apex, a quite pepculiar structure. Virga very large, composed of 12 stout codes of subequal elongth of about 38 μm. Inner lobe of gonocoxite longer than wide and acutely angulate. Gonostylus simple, widest at about middle, without preapical swelling.

Remarks. This specimen belongs to the genus *Metriocnemus* v.d. Wulp, 1874, and is closest to *M. ryutanus* Sasa et Hasegawa, 1988, recorded from Okinawa, in that anal point is stout and abrupty constricted at about distal 1/3, and convered by microtrichia an with lateral setae on basal 2/3, while the distal horn is bare, parallel-sided and apically rounded, and tarsi without terminal spurs, but the present specimen is considered as belonging to a different new species, at least in that in *M. ryutanus* AR is 0.94 and much higher, and DM 20, DL 27, both larger in the numbers.

57. *Metriocnemus yakyijeus* sp. nov. (Figs. 47 a-h) Met-I

A male, holotype, No.384:58, LT at Anbo on March 27. BL 2.39mm, WL 1.64mm, WW/WL 0.29. Head in Fig. 47 a. Eyes bare, ER 1.68 (very high). Antenna with 13 flagellar segments, AR 1.31, AHR 0.60. P/H 1.02. SO 8:8, CL 8. Antepronotum lost from the mounted specimen. Scutum and scutellum in Fig. 47 b. DM 14, all minute, DL 14:14, PA 5:5, SC 12.

Wing (Fig. 47 c) with macrotrichia rather spearsely on only the distal portion. R2+3 separated, RR 0.50. VR 11.34, R/Cu 1.01. Cu2 nearly straight. Squama fringes with 13:9 hairs. Tip of fore tibia (Fig, 47 d) with a long spur, tip of mid tibia (Fig. 47 e) with two short spurs, tip of hind tibia (Fig. 47 f) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.74, mLR 0.48, hLR 0.55, fTR 0.14, fBR 2.3, mBR 2.3, hBR 5.4. Tarsi I and II of mid and hind legs without terminal spur. Pulvilli small, brush-like.

Abdominal tergites (Fig. 47 g, right half) with relatively large numbers of setae, 32 on I, 44 on II, 54 on III, 60 on IV, 64 on V, 60 on VI, 50 on V to VII, and 44 on VIII. Hypopygium in Fig. 47 h. Anal point long, narrow, tapering towards pointed apex, with 16 lateral setae and almost entirely clothed with microtrichia. Virga composed of two stout codes 70 μm long. Inner lobe of gonocoxite low, broad and rounded, bearing setae and microtrichia. Gonostylus simple, parallel-sided and without preapical tooth.

Remarks. This specimen is considered also as belonging to the genus *Metriocnemus*, since wings with macrotrichia, eyes are bare, cu2 nearly straight, costa is extended beyond tip of R4+5, and abdominal tergites with relatively large numbers of setae. However, it is rather unusual as a member of this genus in that macrotrichia on wing are restricted to the

distal portion only, and thus resembles to *M. tristellum* (Edwards) and *M. ursinus* (Holmgren) among the Europepan species, and more to the latter in that wing macrichia are restricted to only the distal portion, anall point is robust, and inner lobe of gonocoxite is low and rounded, but the latter species is different from the present one at least in that anal point has only a few setae in the basal portion, and gonostylus has a preapical tooth (cf. Pinder, 1978, Figs. 132 D,C). The present species is similar also to *M. ryutanus* Sasa et Hasegawa, 1988, and to *M. togamirus* Sasa *et al.*, 1992, in that anal point is present and tarsi and II of mid and hind legs without terminal spur, but both species are quilte different at least in the shape of anal point, the latter small and rectangular, the former constrictred at about distal 1/3 and the distal portion is bare.

58. *Parakiefferiella yakytriangulata* sp. nov. (Figs. 48 a-i)

A male, No.383:33, SWP at Yakusugi Land on March 25. BL 2.28mm, WL 1.21mm, WW/WL 0.30. Body almost uniformly brown, abdominal tergites II to VIII with a pale oral band. Head in Fig. 48 a. Eyes bare, reniform, ER 1.05. Antemma with 13 flagellar segmens, AR 0.56, AHR 0.42, with an apical seta. Palp very short, P/H 0.68. SO 1+5, 1+5, CL 4. Antepronotum (Fig. 48 b) tapering towards middle and separated, with 2:2 lateral setae. Scutum and scutellum in Fig. 48 c. Scutum with a median pale hole, bearing 2 minute setae. DL 4:4, PA 1:1, SC 2.

Win (Fig. 48 d) membrane bare, smooth, squama bare, costa much extended beyond tip of R4+5, which is however situated much proximal to tip of wing and to tip of Cul, R/Cu 0.89. R2+3 separated and ending about midway between tips of R1 and R 4+5, RR 0.46. VR 1.24. Tip of fore tibia (Fig. 48 e) with a long spur, 32 μm long. Tip of mid tibia (Fig. 48 f) without spurs and without any process, a quite unusual stricutre which we have not seen in any adult of Orthocladiinae. Tip of hind tibia (Fig. 48 g) with a long spur (35 μm), but without a short spur, and a comb composed of ony 4 free spines. fLR 0.442, mLR 0.42, hLR 0.43, all very small. fTR 0.10, fBR 2.5, mBR 2.6, hBR 2.8. Pulvilli absent.

Abdominal tergites (Fig. 48 h) with very small numbers of setae, 4 on I, 6 on II, 4 on III, 6 on IV and V, and 8 on VI to VIII., Hypopygium in Fig. 48 i. Anal point very long, parallel-sided and apically rounded, entirely clothed in microtrichia, and with 5 lateral setae on both sides. Virga absent. Inner lobe of gonocoxite double layered, both with rounded margin. Gonostylus quite peculiar, large and roughly triangular, lateral margin rectangularly produced, with a large megaseta, and almost entirely clothed in microtrichia.

Remarks. This specimen belongs to the tribe Orthocladiini of the subfamily Orthocladiinae in basic structure, and is provisionally classified into the genus *Parakiefferiella* Thienemann, 1936, since eyes, wing membrane and squamae are bare, costa extended, AR is small and 0.56, and tip of R4+5 is much proximal to tip of Cul, but is quite different from the previously known species of this genus R2+3 is sepaprated from R4+5 and ending about midway between tips of R1 and R4+5, and quite peculiar in the shape of gonostylus, anal point, and tips of mid and hind tibiae. Therefore, it may be more adequate to create a new genus to accept this spepcies. The peculiar triangular shape of gonostylus is similar to that of

Pseudorthocladius togatriangulata Sasa et Okazawa, 1992, but in this species eyes with a dorsomedial projection and ER is 0.71-0.79, AR is 2.45-2.71 and much higher, DM about 20, squama with many fringe hairs, R/Cu >1.0, anal point is absent, and thus it belongs to a different genus.

59. *Parakiefferiella yakykelea* sp. nov. (Figs. 49 a-i)

A male, No.381:77, SWP at Nagata on March 23. BL 1.38mm, WL 0.78mm, WW/WL 0.38 (very wide). Scutal stripes and postnotum brown, other scutal portions and scutellum pale, legs slightly yellowish, abdominal tergites I and II yellow, III to hypopygium largely brown. Head n Fig. 49 a. Eyes bare, reniform, ER 1.68. Antenna with only 10 flalgellar segments, AR 0.41, AHR 0.19. Palp very short, P/H 0.67. Supraorbital setae absent (SO 0:0, quite unusual), cl only 3. Antepronotum (Fig. 49 b) separated, without seta. Distribution of setae on scutum and scutellum in Fig. 49 c; DM 0, scutum with a median hole, DL 4:4, PA 1:1, SC 2.

Wing membrane bare, plain, squama bare, venation in Fig. 49 d. R2+3 in contact with R4+5, costa extended beyond tip of R4+5, which is proximal to tip of Cul, R/Cu 0.88. VR 1.48 (very high). Cu2 strongly curved. Tip of fore tibia (Fig. 49 e) with a long spur, tip of mid tibia (Fig. 49 f) with two short spurs, tip of hind tibia (Fig. 49 g) with a long and a short spur, and a comb composed of only 7 free spines. fLR 0.50, mLR 0.47, hLR 0.48, fTR 0.13, fBR 1.8, mBR 1.8, hBR 2.5. Pulvilli absent.

Setae on abdominal tergites are very small in the numbers, and their bases are hardly discernible, 4 on I and III, 6 on III and IV, 8 on V to VII, and 6 on VIII. Hypopygium in Fig. 49 h,i. Anal point small and rounded, wider than long, entirely clothed in microtrichia, and with 4 lateral setae. Virga composed of 8 codes, the longest one 30 μm long. Inner lobe of gonocoxite small, longer than wide and with concave posterior margin. Gonostylus widest near the tip, inner margin slightly concave, subapical seta arising on a small angulate process.

Remarks. This specimen is considered as belonging to the genus *Parakiefferiella* Thienemann, 1936, since eyes, wing membrane and squamae are bare, antenna without terminal seta, costa extended beyond tip of R4+5, which is much proximal to tip of Cul with R/Cu value of 0.88, R2+3 is in contact with R4+5, and Cu2 is strongly curved. It is however very unusual as a member of this genus in that body is very small with wing length of only 0.78 μm, the numbers of setae on head, thorax and abdomen are all very small, and body coloration, shape of anal point and inner lobe of gonocoxite are all unusual. It is somewhat related to *P. coronata* (Edwards) among the European species (ref. Fig. 133D of Pinder, 1978), and to *P. osaruflava* Sasa, 1988 among the Japanese species, but differs essentially in body coloration, in the shape and structure of anal point, inner lobe of gonocoxite, and gonostylus.

60. *Parakiefferiella yakylemea* sp. nov. (Figs. 50 a-i)

Two Males, No.384:28, holotype, SWP at Shirotani River on March 27, and No.382:79, paratype, SWP at Miyanoura on march 24. BL 1.55, 1.48mm, WL 0.82, 0.72mm (very small), WW/WL 0.40, 0.41 (very wide). Scutal stripes and postonotum yellowish brown, other scutal

portions and scutellum yellow, legs yellow, abdominal tergites I and II largely brown, anterior haves of tergites III to VI yellow and their posterior halves brown, VII, VIII and hypopygium brown. Head in Fig. 50 a. Eyes bare, reniform and widely separated, ER 2.04, 1.84. Antenna with 12 flagellar segments, AR 0.24, 0.24 (very small). AHR 0.19, 0.19, apical seta absent. Palp short, P/H 0.70, 0.79. SO 2:2, 1:1, CL 5, 4. Antepronotum (Fig. 50 b) widely separated, with 1:1, 1;1 lateral seta. Distribution of setae on scutum and scutellum in Fig. 50 c; DM 0, scutum without median hole, DM 0, 0, DL 6:6, 6:6, DL 5:5, 3:3, SC 4, 3.

Wing membrane bare, plain, without dark marks, squma bare, anal lobe nearly flat, venation in Fig. 50 d. R2+3 in contact with R4+5, which is much proximal to tip of Cul, R/Cu 0.74, 0.87, costa extended much beyond tip of R4+5. FCu much distal to R-M, VR 1.38, 1.18. Cu2 strongly curved. Tip of fore tibia (Fig. 50 e) wth a long spur, tip of mid tibia (Fig. 50 f) with 2 short spurs, tip of hind tibia (Fig. 50 g) with a long and a short spur, and a comb composed of 8 free spines. fLR 0.49, 0.45, mLR 0.43, 0.41, hLR 0.46, 0.50, fTR 0.14, 0.13, fBR 2.7, 2.6, mBR 3.7, 2.8, hBR 3.3, 33.2. Pulvilli absent.

Abdominal tergites with small numbers of setae, 4 on I, 6 on III to VII, and 4 on VIII. Hypopygium in Figs. 50 h,i. Anal point small, nearly triangular and apically pointed, entirely clothed in microtrichia, and with 4 lateral setae. Virga composed of 6 strong codes, the longest one 40 μm long. Inner lobe of gonocoxite also nearly rectangular and apically pointed, with short setae and microtrichia. Gonostylus widest near base and acutely curved inwards near the apex, apically pointed and with strong megaseta but without preapical swelling.

Remarks. This spepcies belongs also the genus *Parakiefferiella* Thienemann, 1936, since eyes are bare and reniform, wings and squamae are bare, antenna without terminal seta, costa extended much beyond tip of R4+5, which is situated much proximal to tip of Cu1, R2+3 in contact with R4+5, and Cu2 is strongly curved. It is also related to the former species, *P. yakykelea* sp. nov. in that body is small, in wing venation and in the structure of hypopygium, but differs at least in that antenna with 12 flagellar segments and AR is smaller, in the peculiar coloration of abdominal tergites, in the numbers of setae on head, thorax and abdomen, and in the shape of anal point, inner lobe of gonocoxite, and gonostylus.

61. *Pseudosmittia (Nikismittia) furudobifurca* Sasa, 1994 (Figs. 51 a-k)

Four males, No.382:66-69, SWP at Miyanoura River on March 24. BL 1.60-1.88 (1.70 in average of 4)mm, WL 0.90-0.98 (0.94)mm, WW/WL 0.34-0.37 (0.36). Thorax, abdominal tergites almost entirey dark brown, legs brown. Head in Fig. 51 a. Eyes bare, reniform, ER 1.28-1.44 (1.35). Antenna with 13 flagellar segments, AR 0.23-0.30 (0.27, very small), AHR 0.21-0.30 (0.27). P/H 0.80-0.94 (0.88). SO composed of 0 or 1 inner and 2, 3 or 4 lateral groups. CL 4 in 3, 5 in 1 specimens. Antepronotum (Fig. 51 b) separated in the midde, with 1:1 (in 3 or 2:2 (in 1) lateral setae. Scutum (Fig. 51 c) without median hole and DM all 0, DL 7-11 (8.5), PA 3:3 (in 3) or 2:2 (in 1), SC 4 (in 3) or 5 (in 1).

Wing (Fig. 51 d) bare, squama all 0, RR 0.64-0.70 (0.67), VR 1.35-1.39 (1.37), tip of R4+5 proximal to tip of Cul, R/Cu 0.86-0.90 (0.88). Costa slightly extended beyond tip of R4+5. Tip of fore tibia (Fig. 51 e) with a long spur, tip of mid tibia (Fig. 51 f) with two short

spurs, tip of hind tibia (Fig. 51 g) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.39-0.48 (0.42), mLR 0.46 or 0.47 (0.47), hLR 0.49-0.51 (0.50), fTR 0.11-0.13 (0.12), fBR 2.3-2.8 (2.5), mBR 2.5-2.7 (2.6), hBR 2.6-3.2 (3.0). Pulvilli absent.

Setae on abdominal tergites (Fig. 51 h) are small in the numbers, 6 on I, and 12 on II to VIII in the holotype. Hypopygium in Fig. 51 i. Anal point (also in Fig. 51 j) is represented by a low and long ridge situated on the midline of ninth tergite, 30 μm long and 10 μm high, entirely clothed in microtrichia. Virga (also in Fig. 51 j) composed of two codes 24 μm long, situated on a cup. Inner lobe of gonocoxite is situated near posterior margin and rectangularly produced inwards, with a darkly pigmented ridge. Gonostylus (also in Fig. 51 k) quite peculiar in the structure, distal half forked into two arms of subequal length and megaseta and apical setae are situated on the inner margin of the lateral, narrower arm, and with a seta also on the inner margin of the median arm.

Remarks. The above structure and measurment data of these specimens are almost coincident with that of *P. furudobifurca* Sasa, 1994, recorded from a lake in Toyama, and was classified into a subgenus, *Nikismittia* Sasa, 1994, by the peculiar structure of gonostylus.

62. *Pseudosmittia (Pseudosmittia) triappendiculata* (Goetghebuer, 1931)

Three males, No.381:15, SWP at Takenokawa River on March 23, and No.383:41,44, SWP at Yakusugi Land on March 25. This species has been recorded also from Japan in Yamanashi and Toyama Prefectures.

63. *Pseudosmittia yakymenea* sp. nov. (Figs. 52 a-i)

A male, No.382:27, SWP at Issogawa on March 24. BL 2.18mm, WL 1.10mm, WW/WL 0.29. Scutal stripes and postnotum dark brown, scutellum, abdominal tergiters and legs brown. Head in fig. 52 a. Eyes bare, reniform, ER 1.67, very wide. Antenna with 13 flagellar segments, AR 1.26 (relatively high), AHR 0.59. Palp short, P/H 0.69. SO 4:4, CL 8. Antepronotum (Fig. 52 b) widely separated, with 1:2 prominent lateral seta. Scutum and scutellum in Fig. 52 c. Scutum with a median pale hole, witht 2 minute setae. DL 9:9, PA 2:2, SC 4.

Wing in Fig. 52 d. Squama bare. R2+3 separated but in contact with R4+5 at the tip. Costa not extended beyond tip of R4+5, which is much proximal to tip of Cul, R/Cu 0.93. VR 1.71, very high. R/Cu 0.93. Cu2 nearly straight. Tip of fore tibia (Fig. 52 e) with a long spur, tip of mid tibia (Fig. 52 f) with only one spur, tip of hind tibia (Fig. 52 g) with a long and a short spur, and a comb composed of as many as 16 free spines. Tips of fore tarsi without spur, but tips of mid and hind tarsi I to IV with one terminal spur, an unusual structure. fLR 0.70, mLR 0.49, hLR 0.55, fTR 0.13, fBR 2.4, mBR 3.1, hBR 3.2. Tarsi V with a small, brushlike pulvilla.

Abdominal tergites (Fig. 52 h) with small numbers of setae, 6 on I, 14 on II and III, 18 on IV and V, and 16 on VI to VIII. Hypopygium in Fig. 52 i. Anal point small, bare, broad and rounded. Small virga present, composed of two codes 16 μm long situated on a cup. Inner lobe of gonocoxite long ,fingerlike and apically rounded, with short setae.

Gonostylus broad, without preapical tooth.

Remarks. This specimen is considered as belonging to genus *Pseudosmittia* Goetguebuer, 1932, and is characterised by that tip of R4+5 is much proximal to tip of Cul, costa not extended beyond tip of R4+5, and anal point is low and broad. Therefore, it is somewhat related to *P. curticosta* (Edwards) among the European spepcies in that AR larger than 1.0, inner lobe of gonocoxite is simple and anal point is present, but in the latter anal point is long and narrow, inner lobe of gonocoxite is small, and gonostylus is widest at tip (ref. Pinder, 1978, Fig. 137 D). It is also somewhat related to *P. nishiharaensis* Sasa et Hasegawa, 1988, among the previously recorded of this genus from Japan, in that tip of R4+5 is proximal to tip of Cul, inner lobe of gonocoxite is single and anal point is present, but in the latter AR is 0.82-0.94 and smaller, anal point is much longer, apically pointed and entirely clothed in microtrichia, and the shape of inner lobe of gonocoxite and gonostylus is quite different (Sasa & Kikuchi, 1995, p.195, Plate 78 I). The terminal structures of leg segments are also quite unusual, mid tibia with only one terminal spur, and tarsi I to V of mid and hind legs with one terminal spur.

64. *Pseudosmittia yakyneoa* sp. nov. (Figs. 53 a-i) Pse-N

A male, No.382:28, SWP at Issogawa on March 24. BL 2.02mm, WL 1.05mm, WW/WL 0.30. Scutum and postnotum largely dark brown, scutellum and abdominal tergites almost uniformly brown, legs brownish yellow. Head in Fig. 53 a. Eyes bare, oval, ER 1.35. Antenna with 13 flagellar segments, AR 1.05, AHR 0.55, without terminal seta. Palp short, P/H 0.76. SO 3:3, CL 6. Antepronotum (Fig. 53 b) widely separated by a groove, with 2:3 lateral setae. Scutum with a median hole bearing two tiny setae, DL 11:11, PA 3:3, SC 4 (Fig. 53 c). Wing membrane bare, very finey granular, brownish, venation in Fig. 53 d. Squama bare, R2+3 separated, RR 0.68. Costa extending much beyond tip of R4+5, which is much proximal to tip of Cul, R/Cu 0.87. FCu much distal to R/M, VR 1.65 (very high), Cu2 short and nearly straight. Anal lobe nearly flat. Tip of fore tibia (Fig. 53 e) with a long (37 μm) spur, tip of mid tibia (Fig. 53 f) also with only one spur (29 μm), tip of hind tibia (Fig. 53 g) with a long (38 μm) and a short (24 μm) spur, and a comb composed of 13 free spines. fLR 0.51, mLR 0.52, hLR 0.58, fTR 0.13, fBR 2.8, mBR 3.2. Pulvilli absemt.

Setae on abdominal tergites (Fig. 53 h) are 4 on I, 14 on II, 16 on III, 18 on IV and V, and 20 on VI to VIII. Hypopygium in Fig. 53 i. Anal point long, widest at base and tapering towards sharply pointed apex, with 3 lateral setae on both sides and entirely clothed in microtrichia. Virga composed of 3 triangular plates situated on a cup. Inner lobe of gonocoxite long and distal end forms an acutely angulate process. Gonostylus simple and widest at about middle.

Remarks. This specimen also belongs to the genus *Pseudosmittia*, and is somewhat related to *P. nishiharaensis* Sasa et Hasegawa, 1988, collected on Okinawa Island, in that anal point is long and tapering towards pointed apepx, but in this species costa is not extended beyond tip of R4+5. It is also related *P. ikemaensis* Sasa et Hasegawa, 1988, recorded from Ikema Island, Okinawa, in that costa is much extended beyond tip of R4+5, but in this

species anal point is Y-shaped and quite different, and tip of mid tibia with two spurs, as usual.

65. *Pseudosmittia yakyopea* sp. nov. (Figs. 54 a-i)

Four males, No.382:43-46, SWP in the town o Miyanoura on March 23. BL 2.48-2.66 (2.59 in average of 4)mm, WL 1.38-1.50 (1.43)mm, WW/WL 0.33-0.34 (0.33). Scutum, scutellum and postnotum black, legs and abdominal tergites brown. Head in Fig. 54 a. Eyes bare, reniform, ER 1.36-1.57 (1.45). Antenna with 13 flagellar segments, AR 0.68-0.73 (0.71), AHR 0.35-0.40 (0.39). P/H 0.89-1.02 (0.95). SO composed of 1 inner and 3 or 4 lateral groups. CL 4-8 (6.3). Antepronotum (fig. 54 b) narrowly united, with 3 or 4 (3.2) lateral setae. Scutum (Fig. 54 c) with a median hole bearing 2 tiny seae, DL 8-12 (9.3, most frequently 9), PA all 3, SC 4 in 3, 6 in 1.

Wing (Fig. 54 d) membrane bare, squama all bare. R2+3 separated, RR 0.27-0.44 (0.33), VR 1.29-1.32 (1.30), R/Cu 0.97-1.03 (1.01). Tip of fore tibia (Fig. 54 e) with a long spur, tip of mid tibia (Fig. 54 f) with two short spurs, tip of hind tibia (Fig. 54 g) with a long and a short spur, and a comb composed of 10 free spines. fLR 0.47-0.50 (0.49), mLR 0.50-0.53 (0.51), hLR 0.53-0.55 (0.54), fTR 0.11-10.3 (0.12), fBR 2.6-3.4 (3.0), mBR 3.0-4.1 (.38), hBR 4.3-4.8 (4.6).

Number of setae on abdominal tergites (Fig. 54 h) are 16 on Ⅰ, 20 on Ⅱ, 24 on Ⅲ to Ⅵ, and 20 on Ⅶ and Ⅷ in No.384:43. Hypopygium in Fig. 54 i. Anal point small but stout, with V-shapepd base and apically rounded, entirely clothed in microtrichia. Inner lobe of gonocoxite double, both low and rounded. Gonostylus simple, almost straight and widest near apex.

Remarks. This species belongs also to genus *Pseudosmittia*, and is characterised in that tip of R4+5 is distal to tip of Cul, anal point is small, longer than wide and apicaly rounded, and inner lobe of gonocoxite is low and braod, and thus similar in structure to *P. kurobeokasia* Sasa et Okazawa, 1992 (in Fig. 78 H,, Sasa et Kikuchi, 1995)), but in this species anal point is narrower and longer, and inner lobe of gonocoxite is single (double in the present species).

66. *Pseudosmittia yakypequea* sp. nov. (Figs. 55 a-p)

A male, No.386:25, LT at the town of Miyanoura on March 28. BL 2.42mm, WL 1.34mm, WW/WL 0.31. Scutum, scutellum and postnotum largely dark brown, legs and abdominal tergites brown. Head in Fig. 55 a. Eyes bare, oval and without dorsomedial projection, ER 1.52. Antenna with 13 flagellar segments, AR 0.59, AHR 0.40. Palp short, P/H 0.88. Supraorbital setae composed of one inner and 6:5 lateral groups. CL 8. Antepronotum (Fig. 55 b) united, with 3:3 lateral setae. DM 0, DL 9:10, PA 3:3, SC 4 (Fig. 55 c).

Wing (Fig. 55 d) membrane bare, smooth, slightly brownish, squama bare, costa slightly extended beyond tip of R4+5, which is located slightly distal to tip of Cul, R/Cu 1.05. R2+3 separated, RR 0.33. FCu much distal to RM, VR 1.36. Tip of fore tibia (Fig. 55 e) with a long (35 μm) spur, tip of mid tibia (Fig. 55 f) with two short spurs, tip of hind tibia (Figs. 55

g,h) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.47, mLR 0.51, hLR 0.54, fTR 0.12, fBR 3.3, mBR 4.0, hBR 4.2. Pulvilli absent.

Setae on abdominal tergites (Fig. 55 i) are 16 on Ⅰ, 18 on Ⅱ, 20 on Ⅲ, 24 on Ⅳ and Ⅴ, and 26 on Ⅵ to Ⅷ. Hypopygium in Fig. 55 j. Anal point (also in Fig. 55 k) small, U-shaped, situated on the middle portion of ninth tergite, entirely clothed in microtrichia. Virga (also in Fig. 55 m) V-shaped, composed of a broad and a narrow code. Inner lobe of gonocoxite (also in Fig. 55 p) simple, widest near apex, with a large megaseta but without apical swelling.

Remarks. This specimen belongs also to the genus *Pseudosmittia*, in the basic structure, but quite characteristic in having a small, U-shaped anal point, inner lobes of gonocoxite are double and partly overlapping, gonostylus is widest near apex, R2+3 is separated, and costa extending beyond tip of R4+5, which is located distal to tip of Cul.

67. *Pseudosmittia yakytaira* sp. nov. (Figs. 63 a-i) Pse-T

A male, No.384:36, SWP at Shirotani River on March 27. BL 2.36mm, WL 1.21mm, WW/WL 0.33. Scutal stripes and postnotum brown, scutellum, legs and abdomen brownish yellow. Head in Fig. 63 a. Eyes bare, reniform, ER 1.24. Antenn with 13 flagellar segments, AR 0.54, AHR 0.40, apical seta absent. P/H 0.86. SO 1+4, 1+5, CL 6. Antepronotum (Fig. 63 b) united, with 4:6 lateral setae. Scutum and scutellum in Fig. 63 c, DM 0, DL 8:8, PA 2:2, SC 4.

Wing (Fig. 63 d) bare, slightly brownish, smooth. Squama bare. R2+3 separated, RR 0.30. VR 1.41 (very high), tip of R4+5 at about the same level as tip of Cul, R/Cu 1.02. Costa not extended beyond tip of R4+5. Cu 2 strongly curved at about distal 1/3. Tip of fore tibia (Fig. 63 e) with a long spur, 29 μm. Tip of mid tibia (Fig. 63 f) with two short spurs, 16 and 20 μm. Tip of hind tibia (Fig. 63 g) with a long (40 μm) and a short (16 μm) spur, and a comb composed of 13 free spines. fLR 0.48, mLR 0.50, hLR 0.51, fTR 0.13, fBR 2.7, mBR 2.4, hBR 2.8. Pulvilli vestigial.

Abdominal tergites (Fig. 63 h) with relatively small numbers of setae, 16 on Ⅰ to Ⅲ, 20 ob Ⅳ, 22 on Ⅴ and Ⅵ, and 20 on Ⅶ and Ⅷ. Hypopygium in Fig. 63 i. Anal point small, situated near base of ninth tergite, widest at base and apically rounded, 28 μm long and 18 μm wide at the base, with 2 lateral setae on base and almost entirely clothed with microtrichia. Virga small, inverted U-shaped, 12 μm long and 7 μm wide. Gonocoxite with a very broad and low ridge along inner mamrgin, but without conspicuous inner lobe, a quite unusual structure. Gonostylus nearly straight and apically truncate, widest at apex, without preapical tooth.

Remarks. This specimen is considered also as belonging to genus *Pseudosmittia*, but is unusual as a member of this genus in that tip of R4+5 is distal to tip of Cul, anal point is small, triangular, apically pointed and entirely clothed in microtrichia, virga is peculiarly shaped, and inner lobe of gonocoxite is very low and long, and thus a new species is created. This species was detected after the first draft of this paper was completed, and thus the figures are added to the last portion.

A key to adult males of genus *Pseudosmittia* Goetghebuer, 1932, collected on Yaku Island

Species belonging to this genus have eyes, wing membrane and squamae all without microtrichia and setae, eyes without dorsomedian projection and ER is larger than 1.2, Cu2 is short and sinuate, DM is absent and scutum often has a median hole.

1- Gonostylus forked into two arms (subgenus *Nikismittia*) WL 0.90-0.98mm, AR 0.23-0.30, R/Cu 0.86-0.90, anal point is a longitudinal ridge on the midline of 9th tergite Psd-F, Figs. 51

- Gonostylus simple, not forked into two arms (subgenus *Pseudosmittia*) 2

2- Tip of R4+5 nearly above tip of Cul, R/Cu 0.97-1.03; WL 1.38-1.50mm, AR 0.68-0.73, costa not extended, anal point with a V-shaped base and distal process longer than wide, parallel-sided and apically rounded Psd-0, Figs. 54

- Tip of R4+5 much proximal to tip of Cul, R/Cu<0.9 3

3- Costa extended much beyond tip of R4+5 3

- Costa not extended beyond tip of R4+5 5

4- AR 1.05, WL 1.05mm; anal point large, widest at baseand tapering towards pointed apex, entirely clothed in microtrichia; inner lobe of gonocoxite low, long and caudal end pointed Psd-N, Figs. 53

- AR 0.59, WL 1.34mm; anal pointt small, U-shaped and apically rounded; inner lobes of gonocoxite double, the basal one rounded and the distal one angulate Psd-P, Figs. 55

5- AR 1.26, WL 1.10mm; tip of mid tibia with only one spur, anal point bare, wider than long and semicircular; inner lobe of gonocoxite very long and narrow, finger-like Psd-M, Figs. 52

5- AR 1.26, WL 1.10mm; tip of mid tibia with only one spur, anal point bare, wider than long and semicircular; inner lobe of gonocoxite very long and narrow, finger-like Psd-M, Figs. 52

- AR smaller than 0.6, tip of mid tibia with two spurs, as usual; anal point small, longer than wide and entirely clothed in microtrichia; inner lobe of gonocoxite low and broad 6

6- Inner lobe of gonocoxite double, both low an longer than wide; anal point nearly parallel-sided and apically rounded; gonocoxite with two inner lobes, both low and broad; AR 0.68-0.73, WL 1.38-1.50mm; gonostylus apically rectangular and widest at apex Psd-O, Figs. 54

- Inner lobe of gonoscoxite single, very low and broad, with rectangular apex; anal point tapering towards pointed apex; gonocoxite with one long and low inner lobe; AR 0.54, WL 1.21mm; gonostylus apically rounded and nearly parallel-sided Psd-T, Figs. 63

68. *Smittia aterrima* (Meigen, 1818) Smi-A

Three males, No.376:26-28, LT at Miyanoura on March 28. This is a species originally recorded from Europe, and has been collected also from more than 10 localities in Japan.

69. *Smittia pratora* (Goetghebuer, 1926) Smi-P

Three males, No.376:29-31, LT at Miyanoura on March 28. This is also a species originally recorded from Europe, and has been collected from Iriomote and Okinawa Island, Okinawa, and also from several localities in the mainland of Japan.

70. *Smittia yakyquerea* sp. nov. (Fig.s 56 a-j) Smi-Q

A male, No.383:46, SWP at Yakusugi Land on March 25. BL 1.99mm, WL 1.18mm, WW/WL 0.31. Scutum and postnotum brown, scutellum, legs and abdomen yellowish brown. Head in Fig. 56 a. Eyes pubescent, reniform, ER 1.16. Antenna with 13 flagellar segments, AR 0.88, AHR 0.42, with a terminal seta at the tip. Palp short, P/H 0.69. SO only 1:1, CL 6. Antepronotum (Fig. 56 b) very narrowly united, with 1:1 minute lateral seta. DM 0, DL 7:7, PA 3:3, SC 3, as in Fig. 56 c.

Wing (Fig. 56 d) bare, very finely granular, squama bare. R2+3 sepaprated from R4+55 and in contact with costa at 0.43% point between tips of R1 and R4+5, but its tip if extended and in contact with the tip of R4+5. VR 1.41 (very high), R/Cu 1.13, Cu2 strongly curved at about middle. Tip of fore tibia (Fig. 56 e) with a long spur, 35 μm, tip of mid tibia (Fig. 56 f) with two short spurs, tip of hind tibia (Fig. 56 g) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.60, mLR 0.46, hLR 0.55, fTR 0.14, fBR 3.1, mBR 4.3, hBR 4.0. Pulvilli absent.

Abdominal tergites (Fig. 56 h) with relatively small numbers of setae, 11 on Ⅰ, 17 on Ⅱ, 18 on Ⅲ to Ⅵ, and 16 on Ⅶ. Hypopygium in Fig. 56 i. Anal point (also in Fig. 56 j) small, hyaline and bare, 20 μm long and 15 μm wide at the base, with V-shaped base and apically rounded, situated in the middle of ninth tergite. Virga absent. Inner lobe of gonocoxite very small, low and rounded. Gonostylus simple, not expanded medially like in most other species of this genus, with a small rectangular preapical tooth.

Remarks. This specimen belongs to the genus *Smittia* Holmgren, 1869, since antenna with a distinct apical seta, wing bare, smooth, squama bare, Cu2 curved, and tip of R4+5 is distal to tip of Cul. It belongs to the group with pubescent eyes, and antenna with 13 flagellar segments, and is somewhat related to *S. togaquirea* Sasa et Okazawa, 1992, in that anal point and inner lobe of gonocoxite are small, but in the latter anal point is still larger and basal half is clothed with microtrichia, inner lobe of gonocoxite is higher than wide, and AR is and larger, 1.44.

71. *Smittia yakyresea* sp. nov. (Figs. 57 a-i) Smi-R

Two males, No.383:47, holotype, and No.383:48, paratype, both SWP at Yakusugi Land on March 25. BL 2.12, 2.04mm, WL 1.39, 1.34mm, WW/WL 0.33, 0.32. Scutal stripes and postnotum dakr brown, scutellum, legs and abdomen brown. Head in Fig. 57 a. Eyes pubescent, reniform, ER 1.10, 1.00. Antenna with 13 flagellar segments, AR 0.80, 0.93, AHR 0.33, 0.31. P/H 0.96. SO all 2, CL 8, 6. Antepronotum (Fig. 57 b) narrowly united, with 0:1, 0:1 lateral seta. DM 0, DL 6:7, 7:8, PA all 3, SC 4, 4 (Fig. 57 c).

Wing (Fig. 57 d) bare, finely granular, squama bare. Costa extended much beyond tip

of R4+5, which is distal to tip of Cul, R/Cu 1.05, 1.07. R2+3 separated, RR 0.41, 0.43, but tip of R2+3 extending in contact with costa to tip of R4+5. VR 1.27, 1.32. Cu2 strongly curved. Tip of fore tibia (Fig. 57 e) with a long spur, tip of mid tibia (Fig. 57 f) with two short spurs, tip of hind tibia (Fig. 57 g) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.53, 0.55, mLR 0.47, 0.46, hLR 0.54, 0.56, fTR 0.13, 0.13, fBR 2.9, 3.6, mBR 3.3, 3.7, hBR 4.2, 7.0. Tips of mid and hind tarsi I and II without terminal spur. Pulvilli absent.

Abdominal tergites (Fig. 57 h) with reativey small numbers of setae, 16 on I, 21 on II and III, 22 on IV and V, 26 on VI, and 24 on VII and VIII in the holotype. Hypopygium in Fig. 57 i. Anal point very narrow and long, 47μm long and only 7 μm wide at the base of chitinized portion. Virga absent. Inner lobe of gonocoxite small, low and rounded. Gonostylus simple, with a rounded preapical tooth.

Remarks. These specimens belong also to the genus *Smittia*, since antenna with a distinct apical seta, wing bare, not granular, squama bare, costa extended, R2+3 separated, R/Cu >1.0, and anal point is well developed. They belong to the group with pubescent eyes, antenna with 13 flaggellar segments. They are somewhat related to *S. togaquirea* Sasa et Okazawa, 1992, in that inner lobe of gonocoxite is small and rounded, and anal point is long and narrow, but in the latter AR is 1.44 and larger, DM present, mLR larger than 0.5, anal point is longer and parallel-sided, and inner lobe of gonocoxite is higher.

72. *Corynoneura kibunespinosa* Sasa, 1989 (Figs. 58 a-e)

A male, No.382:05, SWP at Issogawa on March 24. BL 1.48mm, WL 0.74 mm, WW/WL 00.43. Scutum, scutellum and postnotum brown, legs and abdominal tergites I to IV pale, V to hypopygium brownish yelow. Eyes bare, reniform, ER 1.21. Antenna with 10 flagellar segments, AR 0.41, AHR 0.38. Palp very short, P/H 0.44. SO 0:0, CL 8. Antepronotum united, without setae. DM 0, DL 4:4, PA 2:2, SC 2 (Fig. 58 c). Squama bare, veins R1 and R4+5 fused with thickened costa, VR 3.21, R/Cu 0.27. Tip of fore tibia (Fig. 58 a) with a long (28 μm) spur, tip of hind tibia (Fig. 58 c) strongly expanded and with a long spur (40 μm), a claw-like curved spur, and a comb composed of 20 spines. Tarsi IV all short and cordiform. Pulvilli absent.

Numbers of setae on abdominal tergites are 0 on I, 1 on III to VI and VIII, and 3 on VII. Hypopygium (Figs. 58 d,e) with a long, bare and apically pointed anal point-like process on the ventral side of ninth tergite. Inner lobe of gonocoxite low, broad and rounded. Gonostyllus apically curved inwards and pointed.

Remarks. This specimen is typical also in the structure as a member of the genus *Corynoneura* Winnertz, 1846, especially in thte shape of tip of fore tibia being strongly expanded and in the wing venation, and is diagnosed as belonging to *C. kibunespinosa* Sasa, 1988, by the presence of a typical anal point-like process on the ventral side of ninth tergite and in the coloration of abdomen. This species was originally recorded from Kibune River, Kyoto, and this is the second record.

73. *Corynoneura yoshimurai* Tokunaga, 1936 (Figs. 59 a-j)

Eight males were collected, No.381:76, SWP at Nagata on March 23, No.382: 04, 06, 07, SWP at Issogawa on March 24, and No.384:54, SWP at Shirotani River on March 27. BL 1.02-1.39 (1.25 in average of 8)mm, WL 0.62-0.82 (0.74)mm, wing very wide, WW/WL 0.42-0.46 (0.44). Scutum, scutellum and postnotum brown, legs yellow, abdominal tergites I to III yellow, IV to hypopygium brown. Eyes bare, oval, ER 1.23-1.47 (1.33). Antenna with 8 in 2 specimens), 9 (in 2), or 10 (in 44) flagellar segments, AR 0.30-0.55 (0.42), AHR 0.29-0.38 (0.35). Palp very short, P/H 0.40-0.43 (0.42). SO all 0, CL all 8, PN all 0. Wing bare, venation typical as a member of genus *Corynoneura*, VR 2.56-3.32 (2.98), R/Cu 0.26-0.30 (0.28). fLR 0.51-0.56 (0.54), mLR 0.51-0.61 (0.57), hLR 0.51-0.55 (0.53), fTR 0.19-0.27 (0.23), fBR 2.6-3.3 (3.0), mBR 2.7-3.3 (3.1), hBR 2.6-3.3 (3.0). Tip of fore tibia with a long spur (28 μm), tip of mid tibia with two spurs, 11 and 12 μm, tip of hind tibia strongly expanded and with a long (37 μm) and a short (15 μm) spur and a comb composed of 15 free spines. Tarsi IV of all legs short and cordiform. Pulvilli absent.

The numbers of setae on abdominal tergites are 0 on I, 1 on II to VI and VIII, and 3 on VII. Hypopygium in Figs. 59 i,j. Posterior margin of ninth tergite produced roundly in the middle, but anal point and virga absent. Inner lobe of gonocoxite broad and rounded. Gonostylus acutely curved inwards near apex, and apically pointed.

Remarks. These specimens are considered as belonging to *Corynoneura yoshimurai* Tokunaga, 1936, originally recorded from Kyoto, and redescribed by Sasa (1990) from Unzen (Nagasaki) and by Sasa & Okazawa (1991) from Joganji River (Toyama).

74. *Thienemanniella flaviscutella* (Tokunaga, 1936) (Figs. 60 a-j) Thi-F

Three males, 382:76, SWP at Miyanoura River on March 24, No.383:77,78, SWP at Senpiotaki on March 26. BL 1.41, 1.10, 1.16mm, WL 0.94, 0.70, 0.64mm, WW/WL 0.43, 0.43, 0.47. Scutal stripes and postnotum brown, other scutal portions and scutellum pale, legs yellow, abdominal tergites largely brownish yellow, Head in Fig. 60 a. Eyes reniform, ER 1.29, 1.38, 1.43, slightly pubescent, *i.e.* microtrichia on eyes are very short and visible as small dots only when examined from above but not in lateral view. Antenna with 9, 10, 11 flagellar segments, AR 0.28, 0.19, 0.22, AHR 0.27, 0.34, 0.30. P/H 0.84, 0.77, 0.79. SO 0:0, 1:1, 1:2, CL 9, 8, 7. Antepronotum (Fig. 60 b) tapering towards middle and connected with a point, with 3:3, 4:4, 3:2 lateral setae. DM all 0, DL 9:9, 8:8, 8:8, PA 2:2, 3:3, 2:2, SC all 2 (Fig. 60 c).

Wing membrane bare and smooth, venation as in Fig. 60 d, typical as a member of corynoneurini. Squama bare, R1 and R4+5 fused with thickened costa, VR 1.57, 1.68, 1.77, R/Cu 0.42, 0.38, 0.40. Tip of fore tibia (Fig. 60 e) with a long spur, tip of mid tibia (Fig. 60 f) with two short spurs, tip of hind tibia (Fig. 60 g) with a long and a short spur, and a comb composed of 12 free spines. fLR 0.67, 0.78, 0.78, mR 0.59, 0.57, 0.54, hLR 0.65, 0.65, 0.62, fTR 0.13, 0.15, 0.16, fBR 2.0, 2.5, 1.4, mBR 2.2, 3.6, 1.4, hBR 2.3, 2.5, 1.8. Pulvilli absent.

The numbers of setae on abdominal tergites in No.382:76 are 6 on I and II, and 4 on III to VIII. Hypopygium in Fig. 60 h. Ninth tergite with a long, sharply pointed anal-point like

process on the ventral side, as in the former species. Inner lobe of gonocoxite low and broad. Gonostylus simple, and acutely curved inwards near apex.

Remarks. This species is morphologically typical as a member of genus *Thienemanniella* Kieffer, 1911, and its structure and measurement data are almost coincident with those of *T. flaviscutella* (Tokunaga, 1936), redecribed by Sasa & Okazawa, 1992, with specimens collected at Toga, Toyama.

75. *Thienemanniella vittata* (Edwards, 1924) (Figs. 61 a-i) Thi-V

Altogether 20 males, No.381:73, SWP at Nagata on March 23, No.381:97-100, 382:01-03, SWP at Issogawa on March 24, No.384:08-17, 80-82, SWP at Shirotani River on March 27 and 28. Scutal stripes, scutellum and postnotum dark brown, scutal areas anterior to lateral stripes and posterior to median stripes are yellow, legs yellow, abdominal tergites I to III largely yellow, IV and V largely brown, VI and VII largely yellow and brown bands along lateral and posterior margins, VIII to hypopygium brown. BL 1.42-1.98 (1.70 in average of 11)mm, WL 0.92-1.04 (0.98)mm, WW/WL 0.37-0.41 (0.39). Head in Fig. 61 a. Eyes highly pubescent, ER 1.36-1.91 (1.54). Antenna all with 12 flagellar segments, AR 0.48-0.72 (0.59), AHR 0.34-0.46 (0.40). P/H 0.56-0.76 (0.66). Antepronotum (Fig. 61 b) tapering towards apex and separated, with 0, 1 or 2 (1.2) lateral setae. Scutum and scutellum in Fig. 61 c. Scutum without median hole and DM all 0, DL 8-11 (9.6), PA 1, 2 or 3 (2.6), SC all 2.
Wing in Fig. 61 d, venation typical as a member of Corynoneurini. Squama bare, VR 1.92-2.17 (2.04), R/Cu 0.31-0.47 (0.39). Cu2 short and straight. Tip of fore tibia (Fig. 61 e) with a long spur, tip of mid tibia (Fig. 61 f) with two short spurs, tip of hind tibia (Fig. 61 g) not expanded, with a long and a short spur, and a comb composed of 10 free spines. fLR 0.68-0.73 (0.70), mLR 0.63-0.67 (0.65), hLR 0.65-0.71 (0.68), fTR 0.11-0.12, fBR 2.8-3.0 (2.9), mBR 2.9-3.8 (3.4), hBR 3.3-4.1 (3.7). Pulvilli absent.

Abdominall tergites (Fig. 61 h) with 4 setae on I to IV and VI to VIII, and 6 on V. Hyppygium in Fig. 61 i. Anal point absent, virga composed of two codes 24 μm long. Inner lobe of gonocoxite rectangularly produced. Gonostylus nearly straght and parallel-sided.

Remarks. The above structure and measurement data are almost coincident with those of specimens collected from Lake Biwa, Shiga, by the name of *Thienemanniella vittata* (Edwards, 1924), and the hypopygium is as illustrated in Fig. 141 B of Pinder (1978).

76. *Thienemanniella yakysetea* sp. nov. (Figs. 62 a-j) Thi-S

A male, No.382:70, SWP at Miyanoura River on March 24. BL 1.52mm, WL 0.81mm, WW/WL 0.41. Scutum, scutellum and postnotum largely brown, legs yellow, abdominal tergities largely brownish yellow but anterior portions of II to VII slightly paler. Head in Fig. 62 a. Eyes reniform, highly pubescent, ER 1.84. Antenna with 10 flagellar segments, AR 0.49, AHR 0.39. Palpp short, P/H 0.55. SO 0:0, CL 7. Antepronotum (Fig. 62 b) tapering towards middle and connected with a point, with 0:1 lateral seta. DM 0, DL 6:6, PA 2:2, SC 2 (Fig. 62 c).

Wing (Fig. 62 d) with typical venation as a member of Corynoneurini, squama bare, VR

1.72, R/Cu 0.34. Tip of fore tibia (Fig. 62 e) with a spur 25 μm long, tip of mid tibia (fig. 62 f) slightly expanded and with two spurs 25 μm long, tip of hind tibia (Figs. 62 g,h) also slightly expanded and with two spurs and a comb composed of 10 free spines. In the fore leg, tarsus Ⅳ is short and cordiform, pulvilli absent, fLR 0.86 (very high), fTR 0.14, fBR 2.3. Mid and hind tarsi all lost.

Abdominal tergites Ⅰ with 2, Ⅱ to Ⅳ with 3, and Ⅴ to Ⅷ with 2 setae. Hypopygium in Fig. 62 i. Anal point conical, apically pointed and situated in the middle of ninth tergite, entirely clothed in microtrichia. Inner margin of gonocoxite slightly expanded near apex. Gonostylus simple, widest at about middle, inner margin nearly straight and not curved inwards near apex.

Remarks. This specimen is typical as a member of genus *Thienemanniella* in basic structure, but is quite characteristic in the presence of conical anal point and in the shape of inner lobe of gonocoxite and gonostylus.

Subfamily Tanypodinae

77. *Ablabesmyia monilis* (Linnaeus, 1763)

A male, 381:80, SWP at Issogawa River on March 24. This species has been recorded also from Japan at more than 10 localities (Sasa & Kikuchi, 1995, p.83).

78. *Conchapeplopia quatuormaculata* Fittkau, 1962

Four males, No.382:36, SWP in the town of Miyanoura on March 23, No.382:92, LT in the town of Miyanoura on March 24, No.384:30, SWP at Shiratori River on March 27, and No.384:89, LT in the town of Miyanoura on March 28. This species was first recorded from Kyoto, Japan, by Tokunaga (1937) by the name of *Pentaneura melanops* Meigen, to which the above new name was given by Fittkau (1962) without giving morphological accounts. Recently, Sasa (1990) described the specimens collected from Jinzu River (Toyama) by the above new name.

79. *Rhenopelopia ornata* (Meignen, 1838)

A male, No.382:93, LT in the town of Miyanoura on March 24, was identified as the above species by kind examination of Mr. Tadashi Kobayashi, who is now conducting comprehensive studies on Tanypodinae of Japan. This species was recorded by Sasa & Okazawa (1993) from a highland of Bijodaira, Toyama, and this is the second record from Japan.

ACKNOWLEDGEMENT

The authors are thankful to Mr. Tadashi Kobayashi for identified of *R. ornata* (Meigen, 1838) to Mrs. Setsuko Suzuki for undertaking many of the slide-mounted specimens used in the present studies, and to Miss Miyoko Takagi and Mr. Hidefumi Tanaka for assistances in compiling this report.

REFERENCES

References to identification of Japanese chironomid species listed by chronological orders are as follows.

The two monographs of Chironomidae of Japan.

1) Sasa, M. and Kikuchi, M. (1995): Chironomidae of Japan. 333 pp. Univ. Tokyo Press.
2) Sasa, M. (1998): Chironomidae of Japan, 1998. 156 pp. Res. Rep. Kankyo Fukushi Kenkyusho

The papers referring to taxonomy of Japanese chironomids published by us after the above monographs are as follows.

3) Sasa, M. (1997): Studies on the chironomid spepcies collected throughout the year in the Shofuku Garden, near the mouth of Kurobe River, Toyama. *TPES* 1996, pp. 15-69
4) Sasa, M. & Sumita, M. (1997): The chironomid species collected on the shore of Lake Kibagata by light trap. TPES 1997, pp. 70-74
5) Sasa, M. T Suzuki, H. (1997a): Studies on the Chironomidae collected from the Ogasawara Islands, southern Japan. Eido (Med. Ent. Zool.) 48: 315-343
6) Sasa, M. & Suzuki, H. (1997b): Studies on the chironomid species collected in Kyushu. TPES 1997, pp. 75-105
7) Sasa, M. & Suzuki, H. (1998): Studies on the chironomid midges collected in Hokkaido and northern Honshu. Trop. Med. 40 (1): 9-43
8) Sasa, M., Suzuki, H. & Sakai, T. (1998a): Studies on the chironomid midges collected on the shore of Shimanto River in Appril 1998. Part 1. Description of the species of the subfamily Chironominae. Trop. Med. 40 (2): 47-89
9) Sasa, M., Suzuki, H. & Sakai, T. (1998b): Studies on the chironomid midges collected on the shore of Shimanto River in Appril 1998. Part 2. Description of additional lspecies belonging to Orthocladiinae, Diamesinae and Tanypodinae. Trop. Med. 40 (3): 99-147.
10) Sasa, M. & Tanaka, N. (1998): Notes on the chironomid species collected in Gunma Prefecture in 1996-1997. Annual Rep. Gunma Prefect. Inst. Med. & Environ. Sci., 1998, pp. 37-46
11) Kobayashi, T. & Suzuki, H. (1999a): *Harnischia omuraensis* sp. nov. and the first record of *Parachironomus monochromus* (van der Wulp) from Japan. *Med. Entom.* Zool. 50 (2): 79-84
12) Kobayashi, T. & Suzuki, H. (1999b): The first record of genus *Apometriocnemus* Saether, 1985, from the Palaearctic Region. Tijdschrft voor Entomologie, 142: 65-67
13) Sasa, M. & Ogata, K. (1999): Taxonomic studies on the chironomid midges collected from the Kurobe Municipal Sewage Treatment Plant. Med. Entom. Zool. 50 (2): 85-104
14) Sasa, M. & Suzuki, H. (1999a): Studies on the chironomid midges of Tsushima and Iki Islands, Western Japan. Part 1. Species of Chironominae collected on Tsushima. Trop. Med. 41 (1): 1-53
15) Sasa, M. & Suzuki, H. (1999o): Studies on the chironomid midges of Tsushima and Iki Islands, western Japan. Part 2. Species of Orthocladiinae and Tanypodiae collected on Tsushima. Trop. Med. 41 (2): 75-132

16) Sasa, M. & Suzuki, H. (1999c): Studies on the chironomid midges of Tsushima and Iki Islands, western Japan. Part 3. The chironomid species collected on Iki Island. Trop. Med. 41 (3): 143-179
17) Sasa, M. & Tanaka, N. (1999): Study on the new species of chironomids collected with light traps at the side of Ino River, Gunma Prefecture. Annual Rep. Gunma Pref. Inst. Publ. Health & Envir. Sci. No.31, 38-40
18) Sasa, M. & Suzuki, H. (2000): Studies on the chironomid species collected on Ishigaki and Iriomote Islands, southern Japan. Trop. Med. 42 (1): 1-37

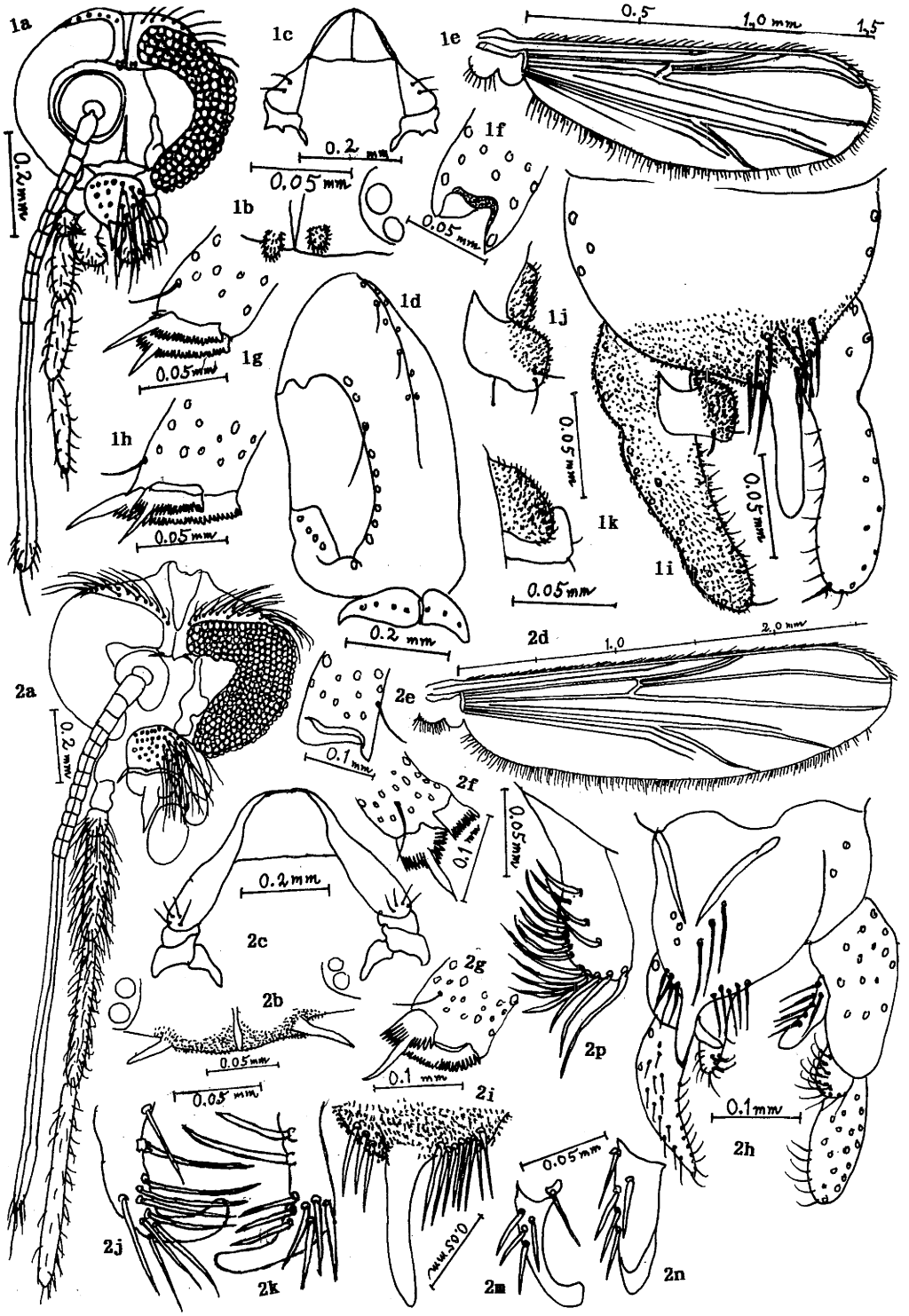

Fig. 1. *Paracladopelma kuramaclara* Sasa, 1989
Fig. 2. *Microtendipes amamihosoides* Sasa, 1990

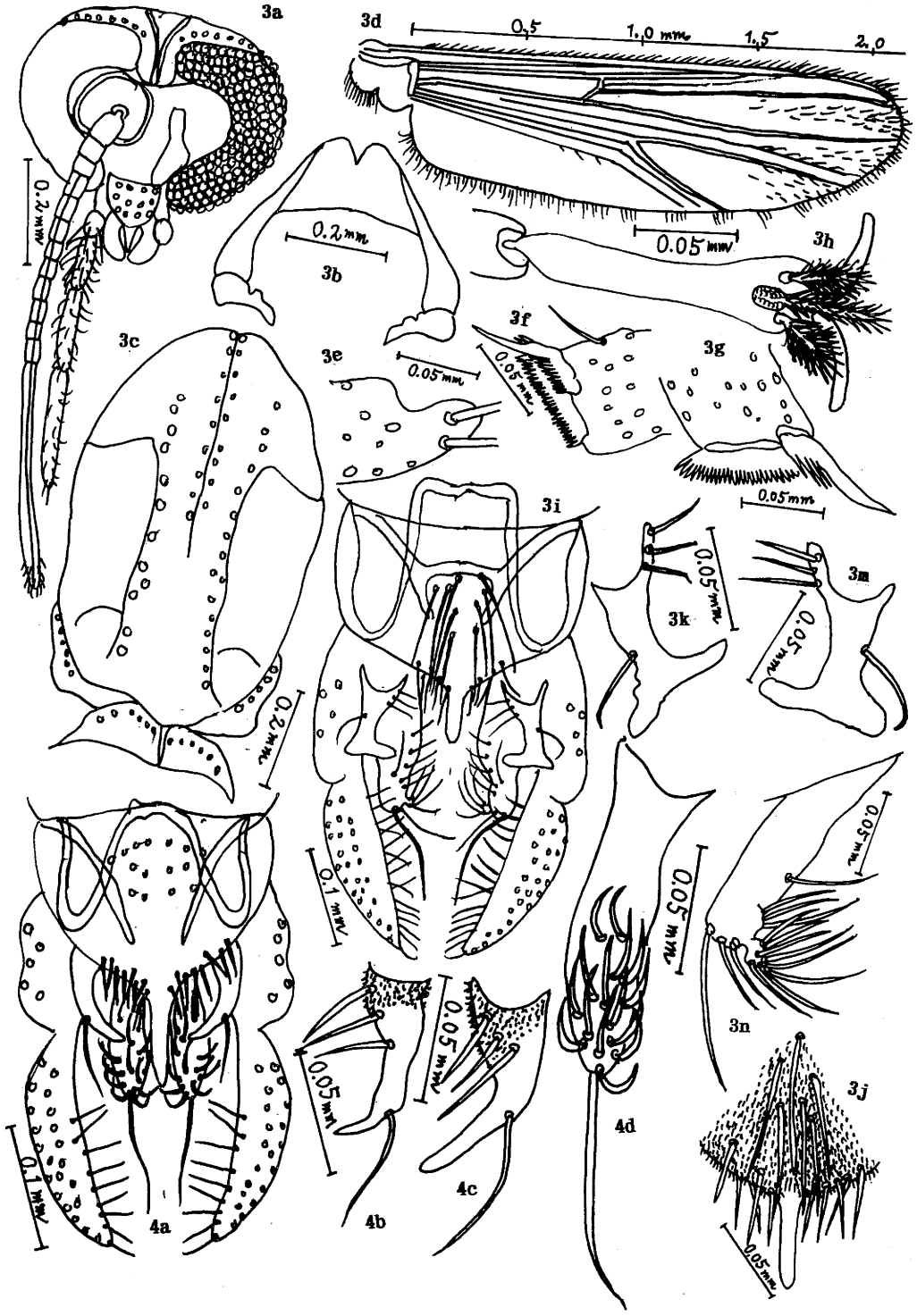

Fig. 3. *Pentapedilum yakuabeum* sp. nov.
Fig. 4. *Pentapedilum uncinatum* Goetghebuer. 1921

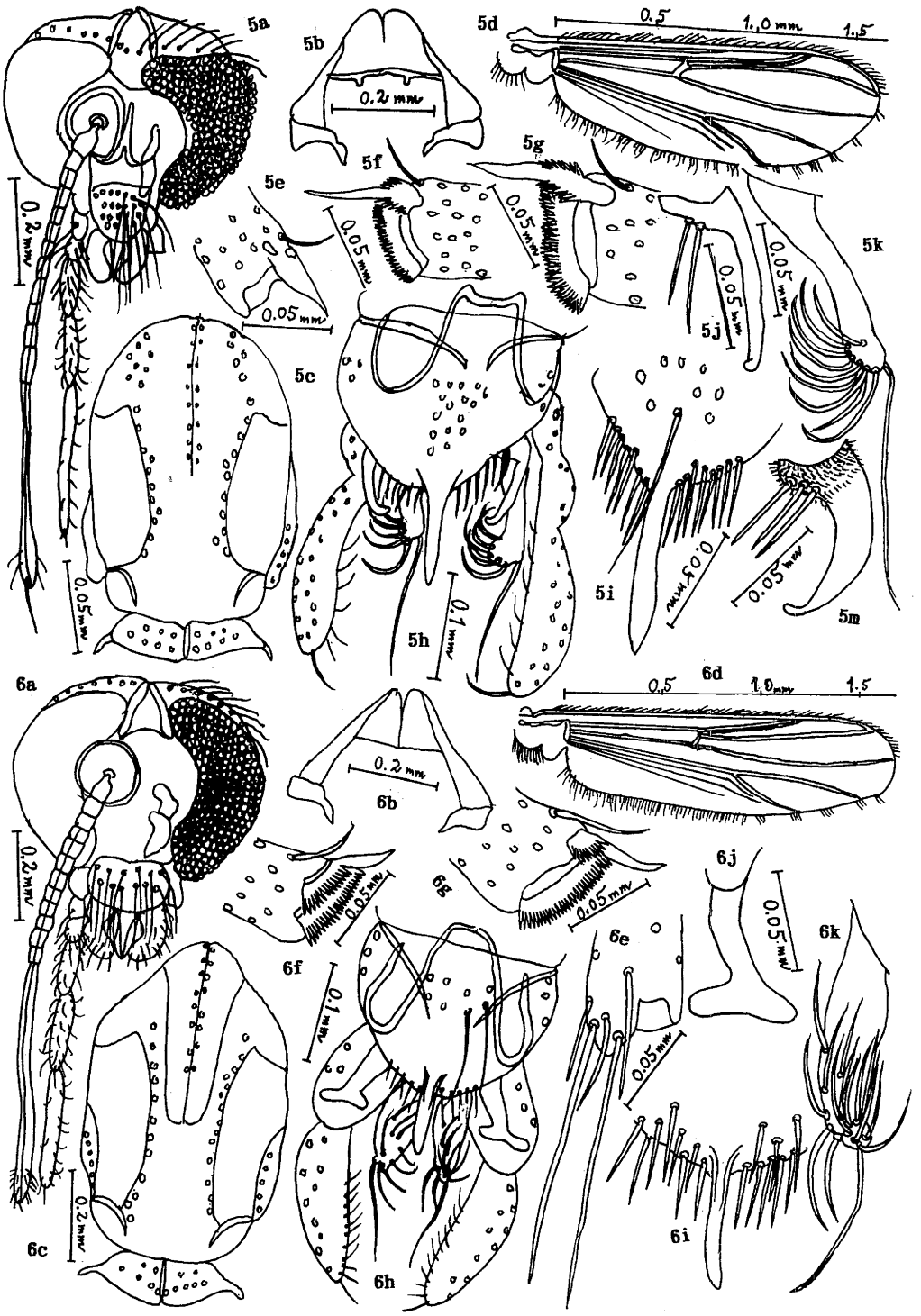

Fig. 5. *Polypedilum (Polypedilum) yakubeceum* sp. nov.
Fig. 6. *Polypedilum (Polypedilum) yakucedeum* sp. nov.

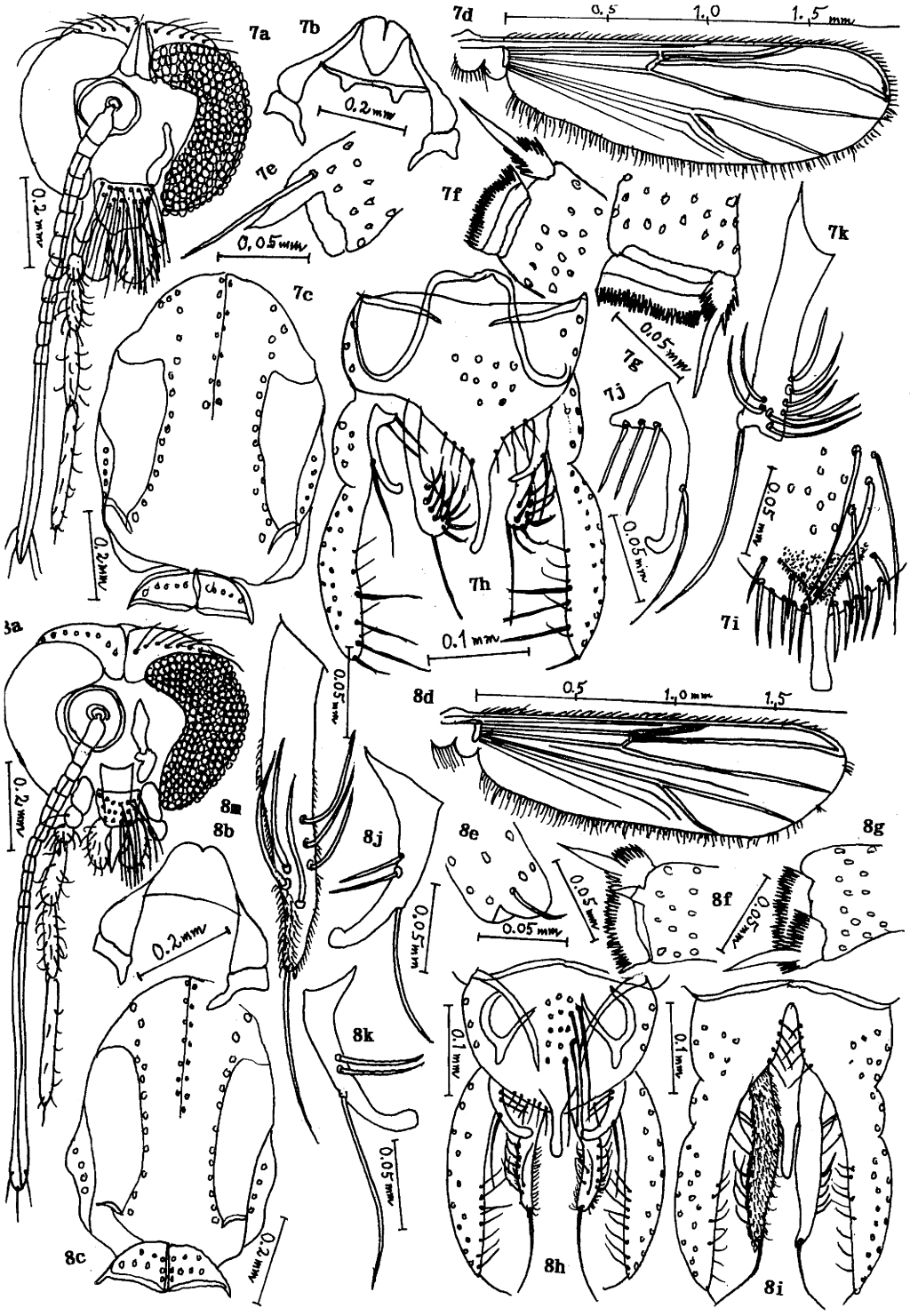

Fig. 7. *Polypedilum (Polypedilum) okiflavum* Sasa, 1990
Fig. 8. *Polypedilum (Polypedilum) tsukubaense* (Sasa. 1979)

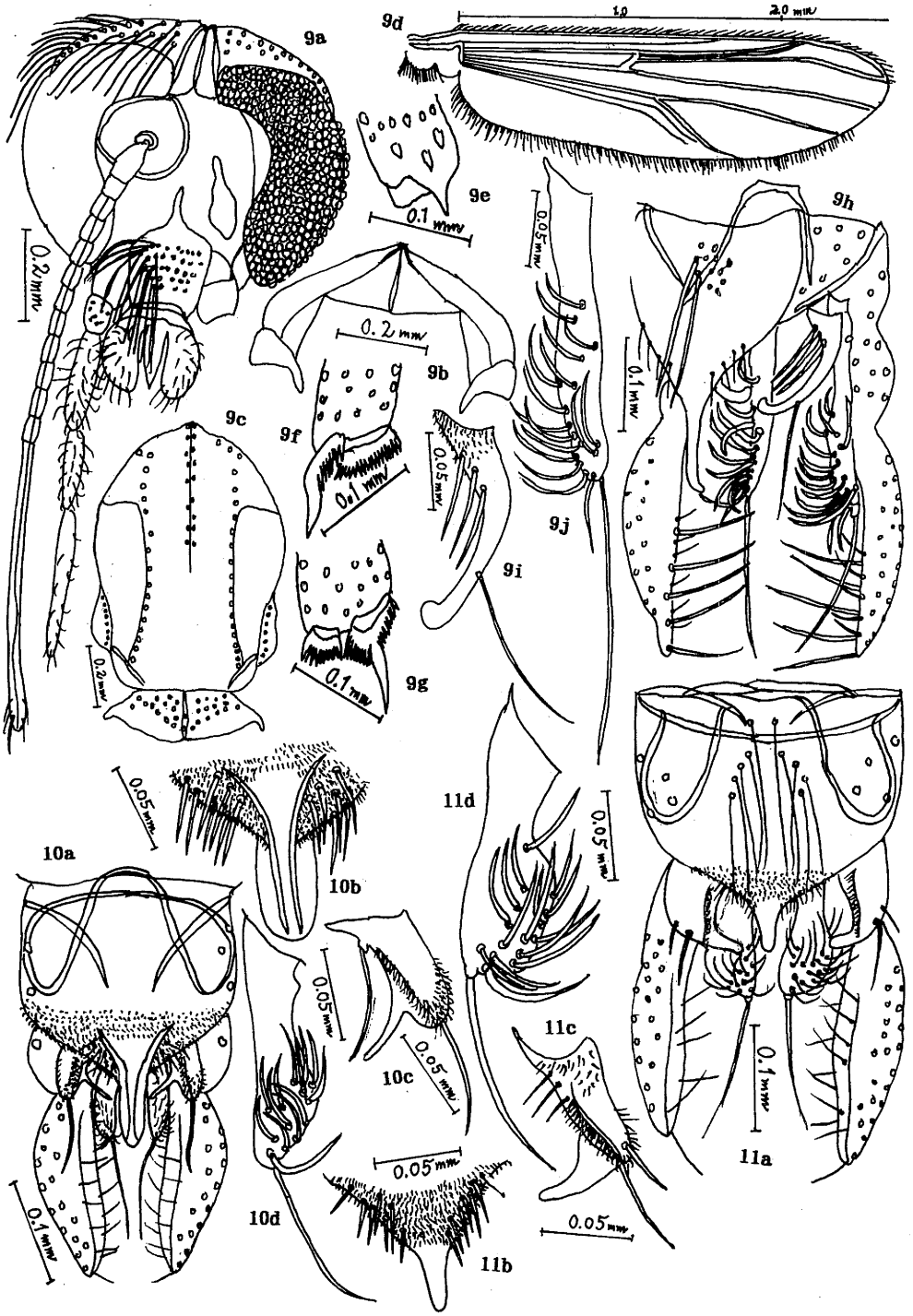

Fig. 9. *Polypedilum (Polypedilum) yakudeeum* sp. nov.
Fig. 10. *Polypedilum (Uresipedilum) convictum* (Walker, 1856)
Fig. 11. *Polypedilum (Uresipedilum) cultellatum* Goetghebuer, 1931

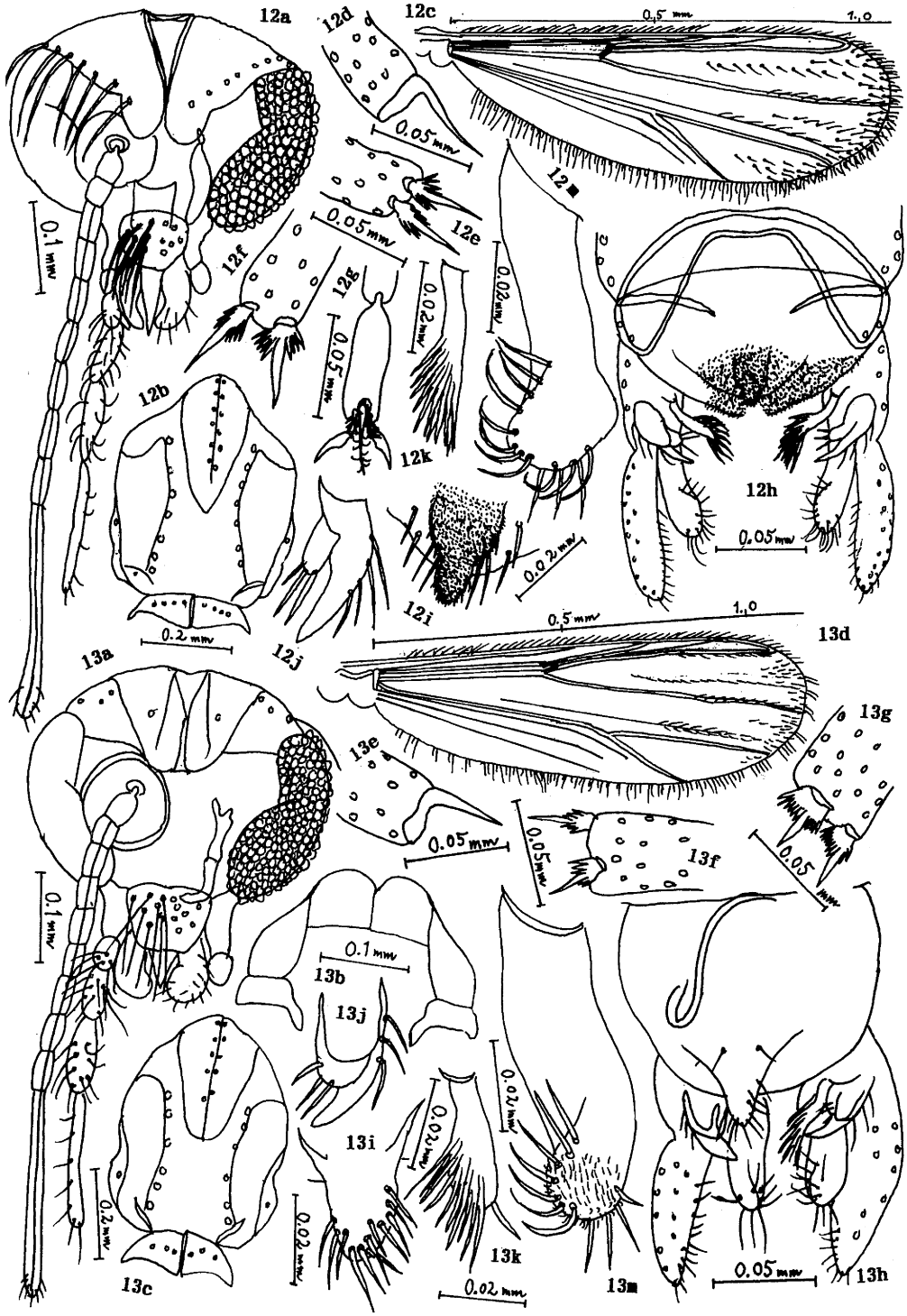

Fig. 12. *Cladotanytarsus yakuefeus* sp. nov.
Fig. 13. *Cladotanytarsus yakufegeus* sp. nov.

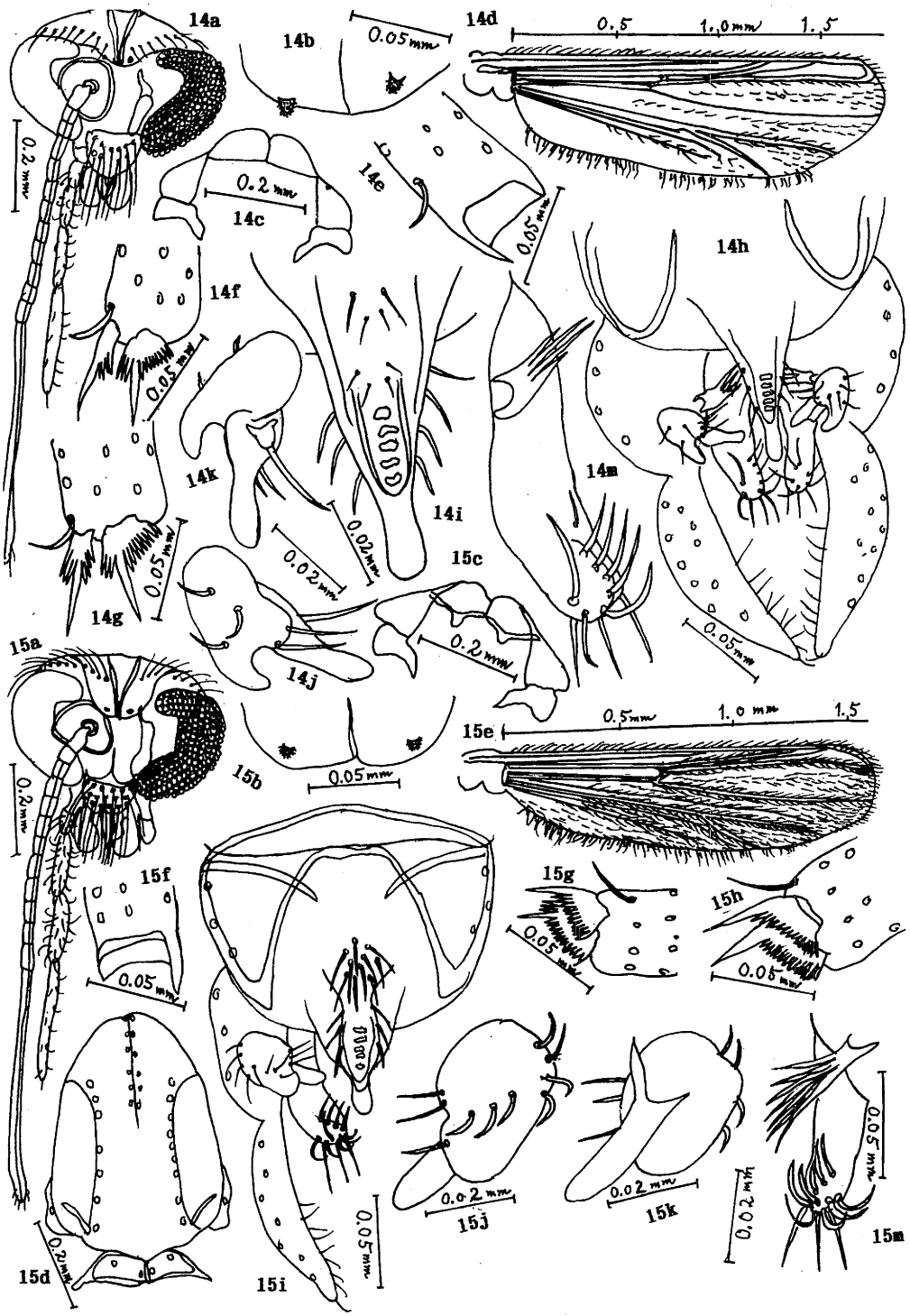

Fig. 14. *Tanytarsus oyaberotundus* Sasa, Kawai et Ueno, 1988
Fig. 15. *Tanytarsus shouautumnalis* Sasa, 1989

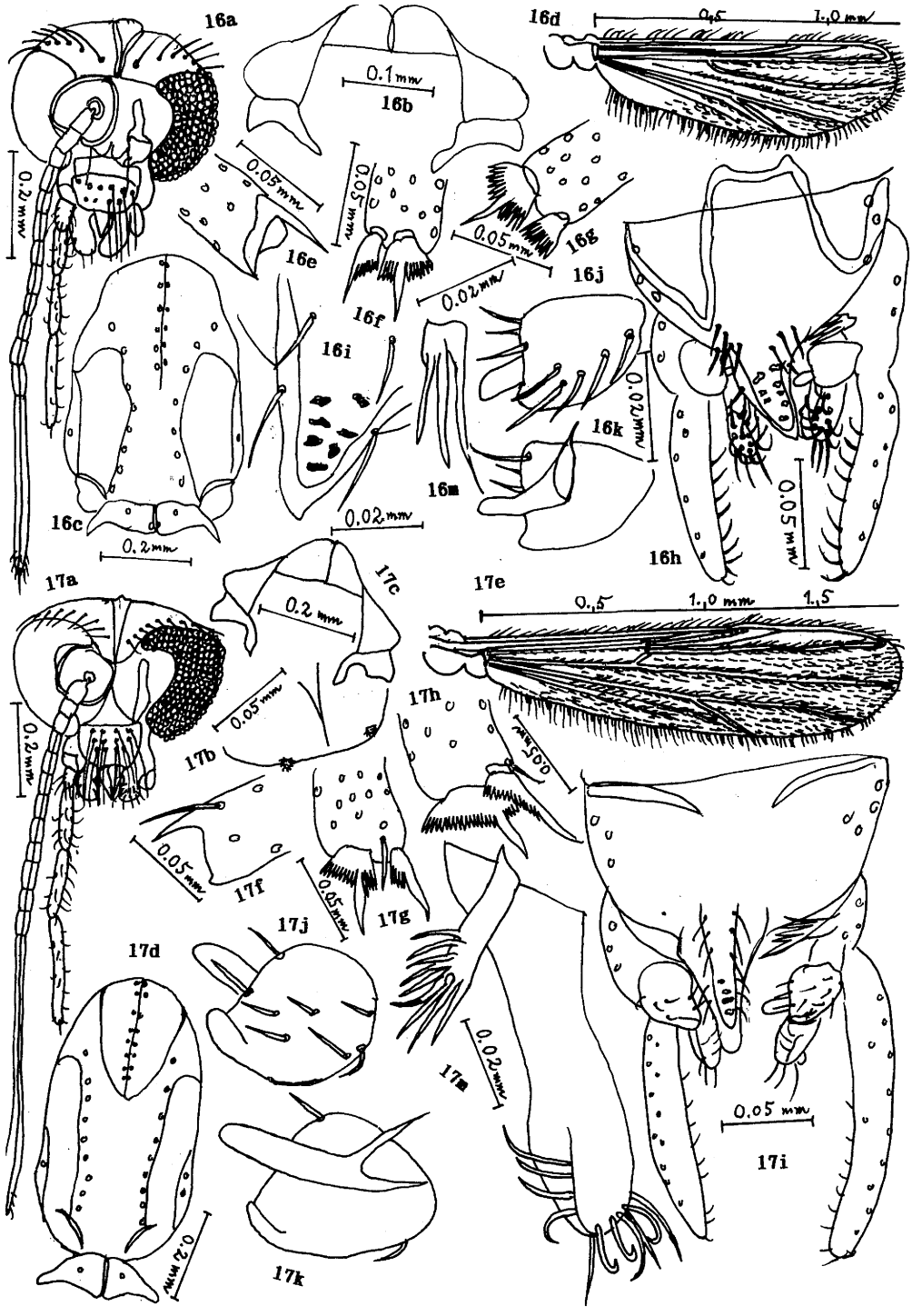

Fig. 16. *Tanytarsus tamaduodecimus* Sasa, 1983
Fig. 17. *Tanytarsus yakugeheus* sp. nov.

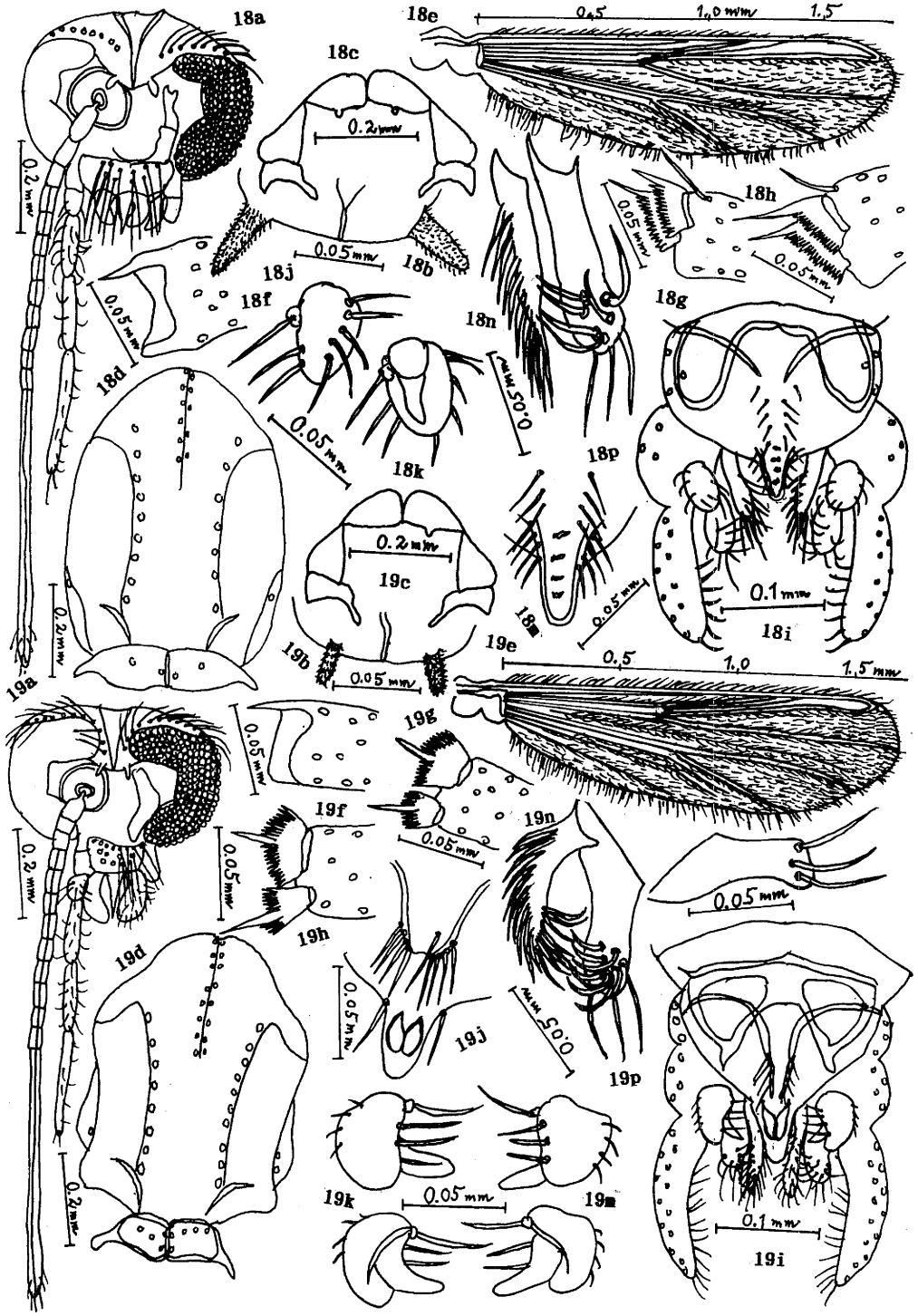

Fig. 18. *Tanytarsus yakuheius* sp. nov.
Fig. 19. *Tanytarsus yakuijeus* sp. nov.

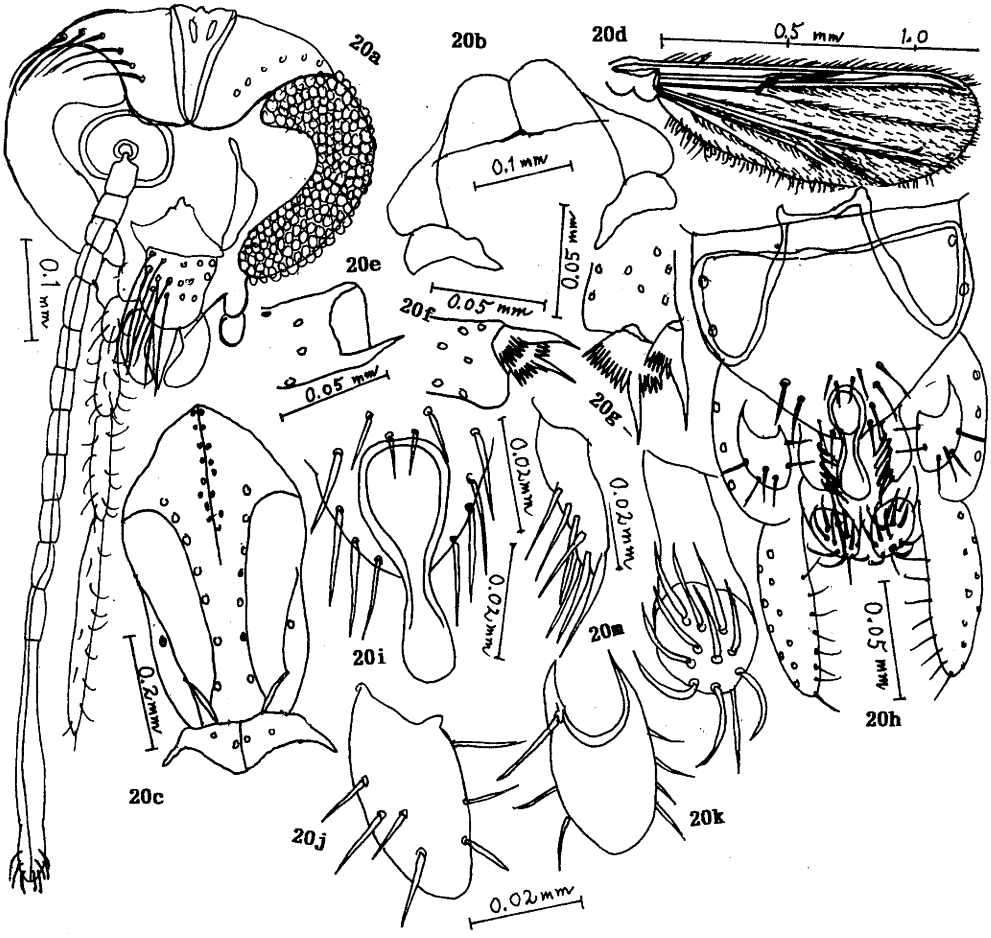

Fig. 20. *Tanytarsus yakujekeus* sp. nov.

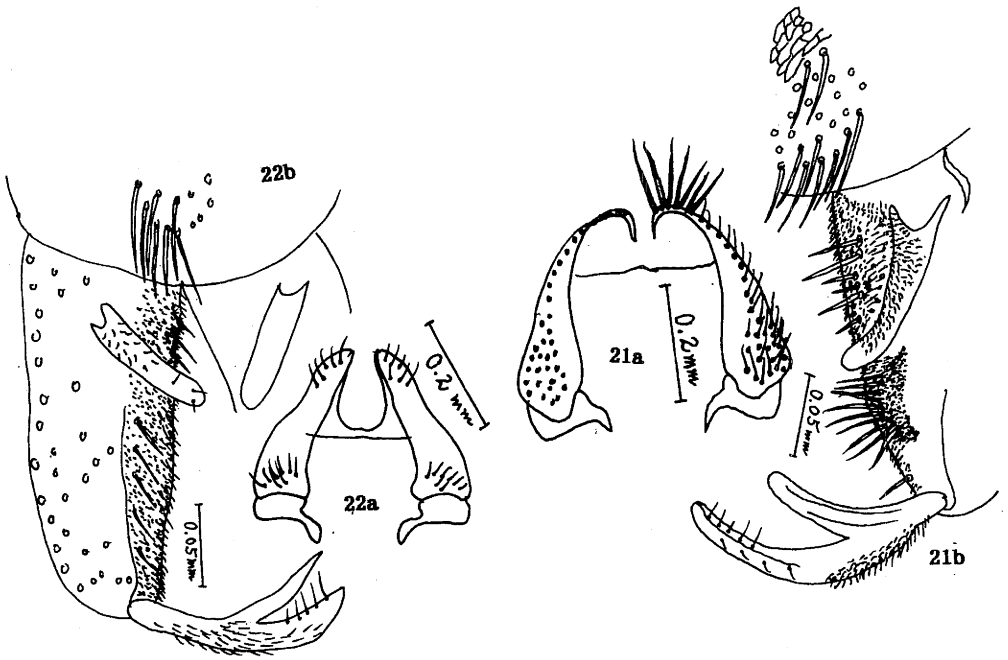

Fig. 21. *Brillia japonica* Tokunaga, 1939
Fig. 22. *Brillia modesta* (Meigen, 1830)

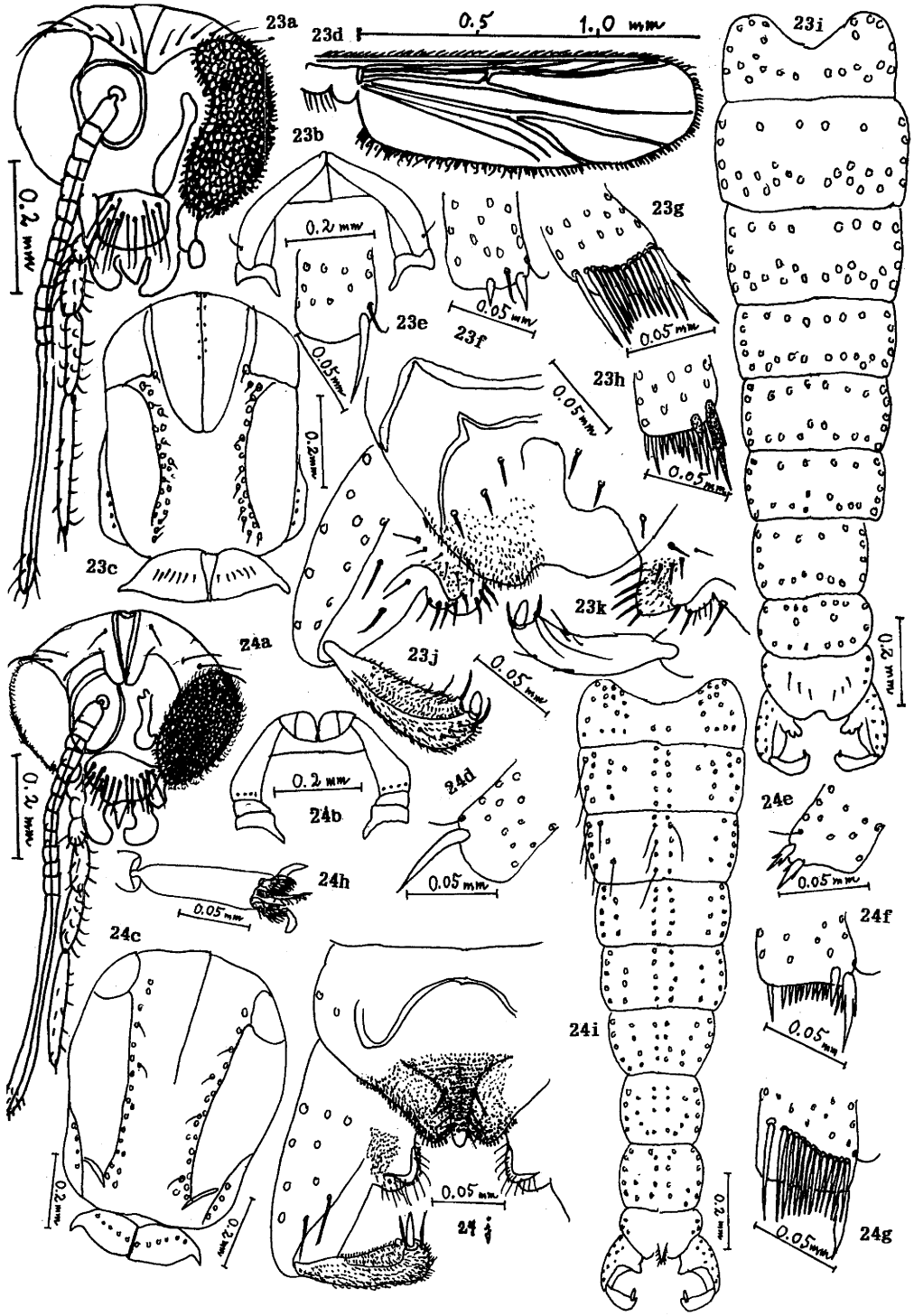

Fig. 23. *Paratrichocladius yakukeleus* sp. nov.
Fig. 24. *Rheocricotopus yakulemeus* sp. nov.

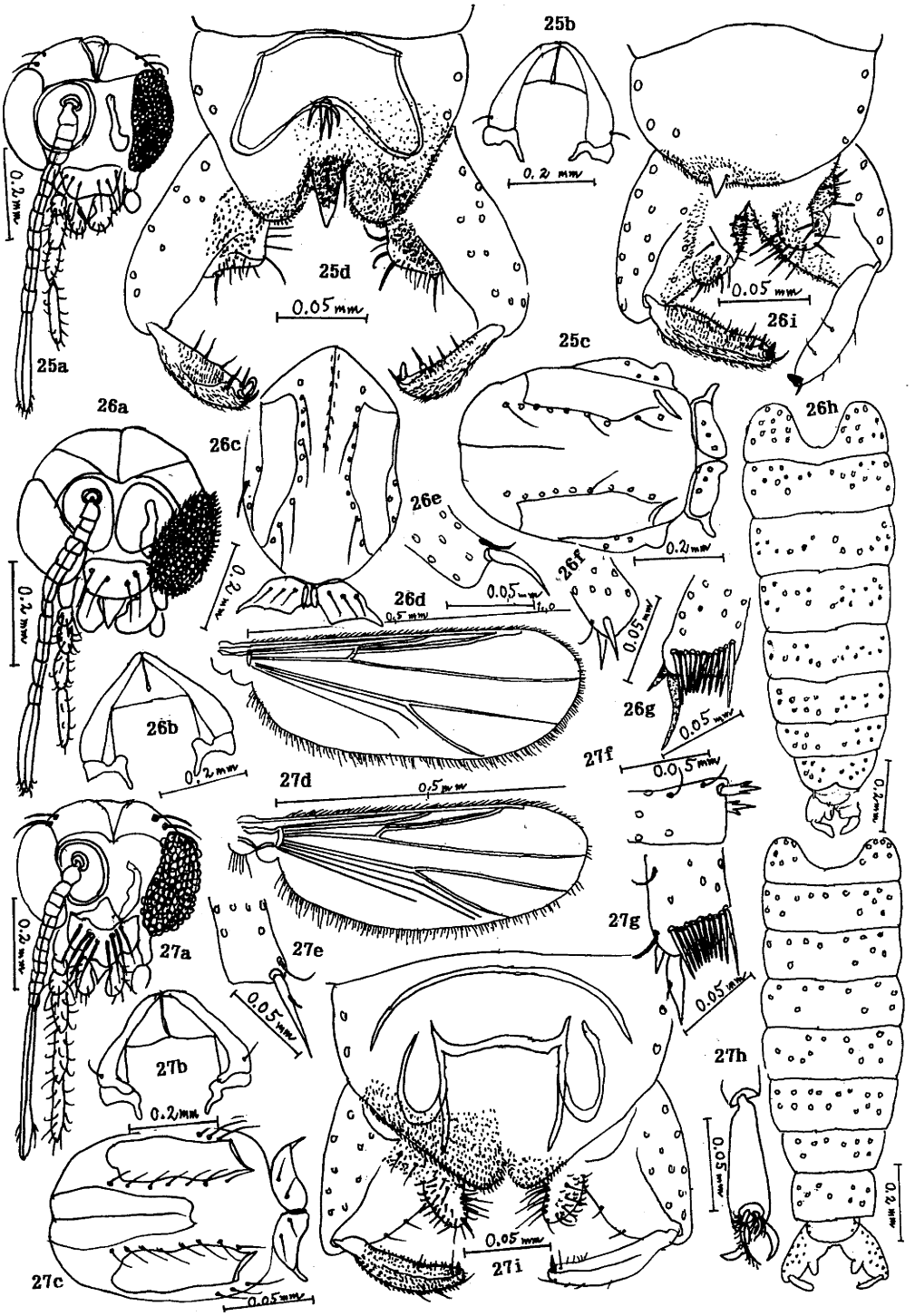

Fig. 25. *Eukiefferiella tamaflava* Sasa, 1981
Fig. 26. *Eukiefferiella yakumenea* sp. nov.
Fig. 27. *Eukiefferiella yakuneoa* sp. nov.

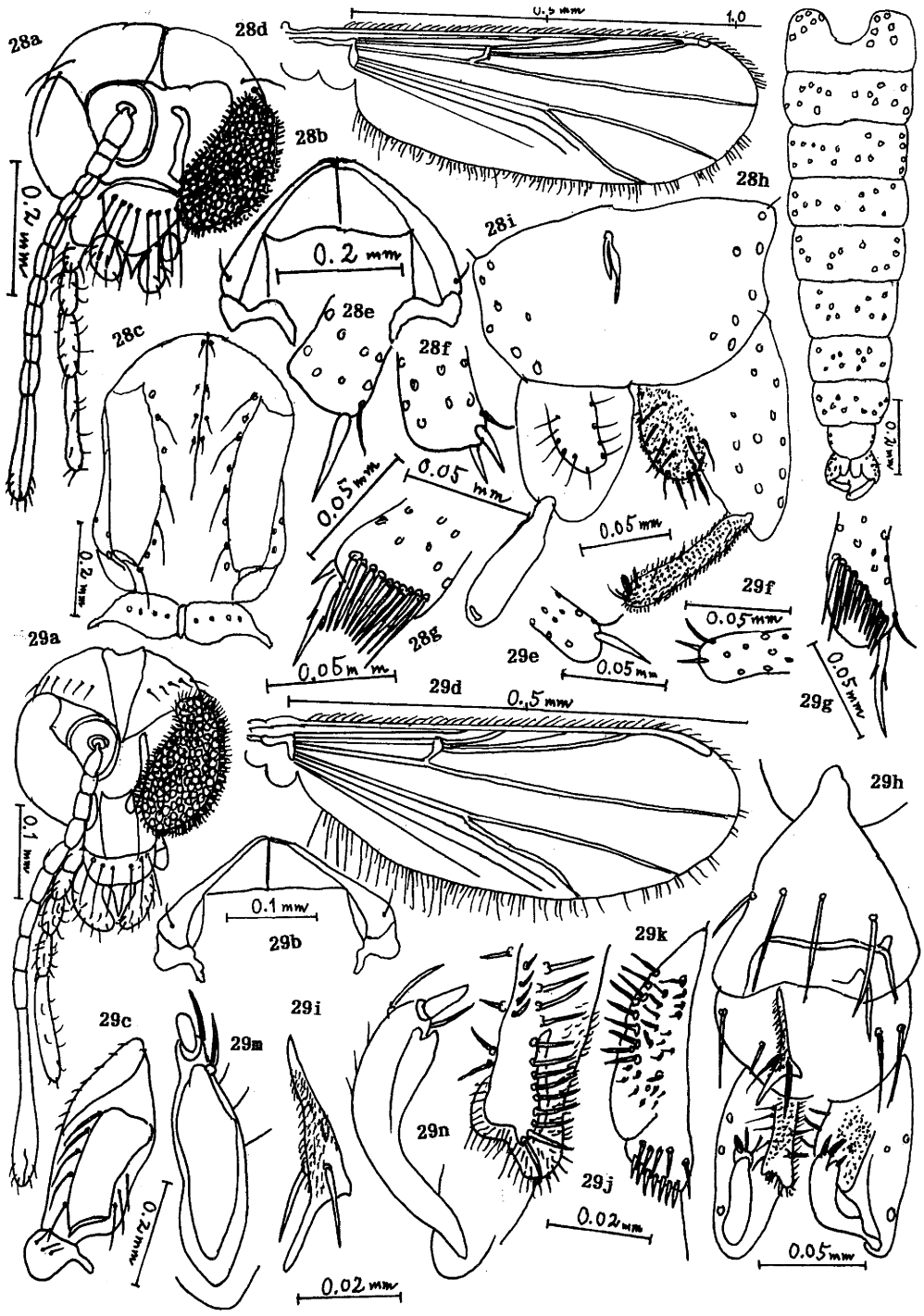

Fig. 28. *Eukiefferiella yakuopea* sp. nov.
Fig. 29. *Eukiefferiella yakupequea* sp. nov.

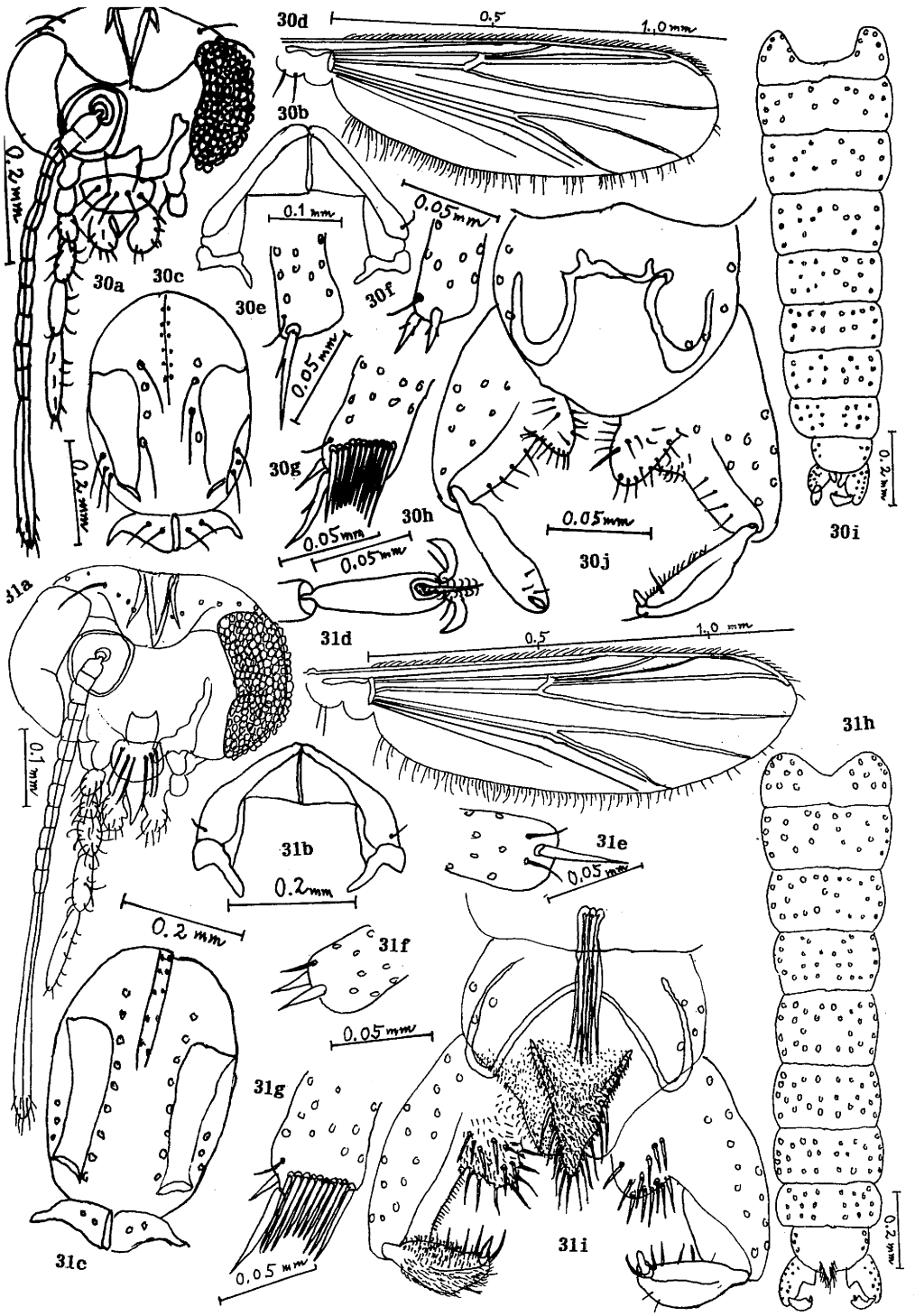

Fig. 30. *Eukiefferiella yakuquerea* sp. nov.
Fig. 31. *Eukiefferiella yakuresea* sp. nov.

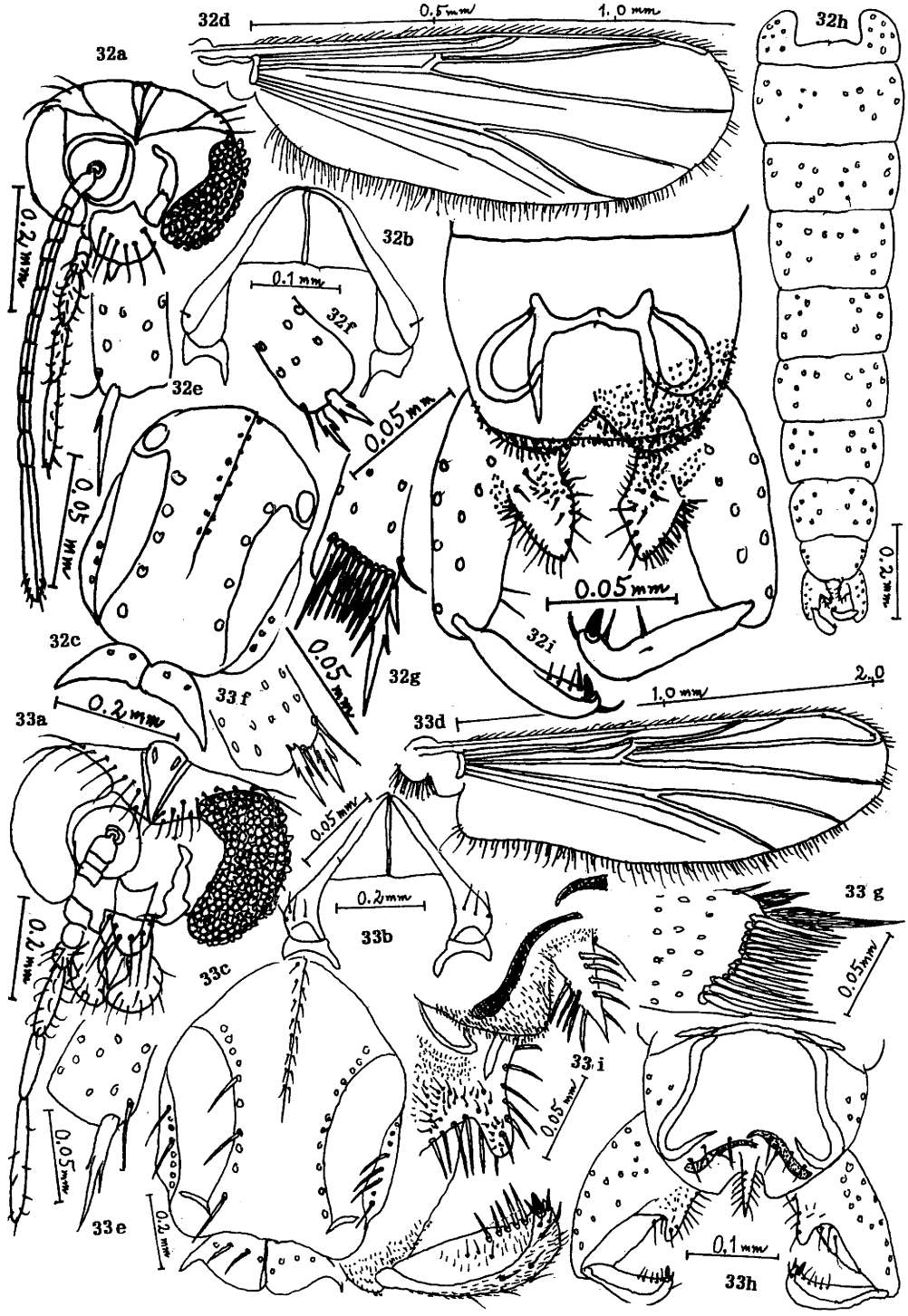

Fig. 32. *Eukiefferiella yakusetae* sp. nov.
Fig. 33. *Orthocladius* sp. "yakuteua"

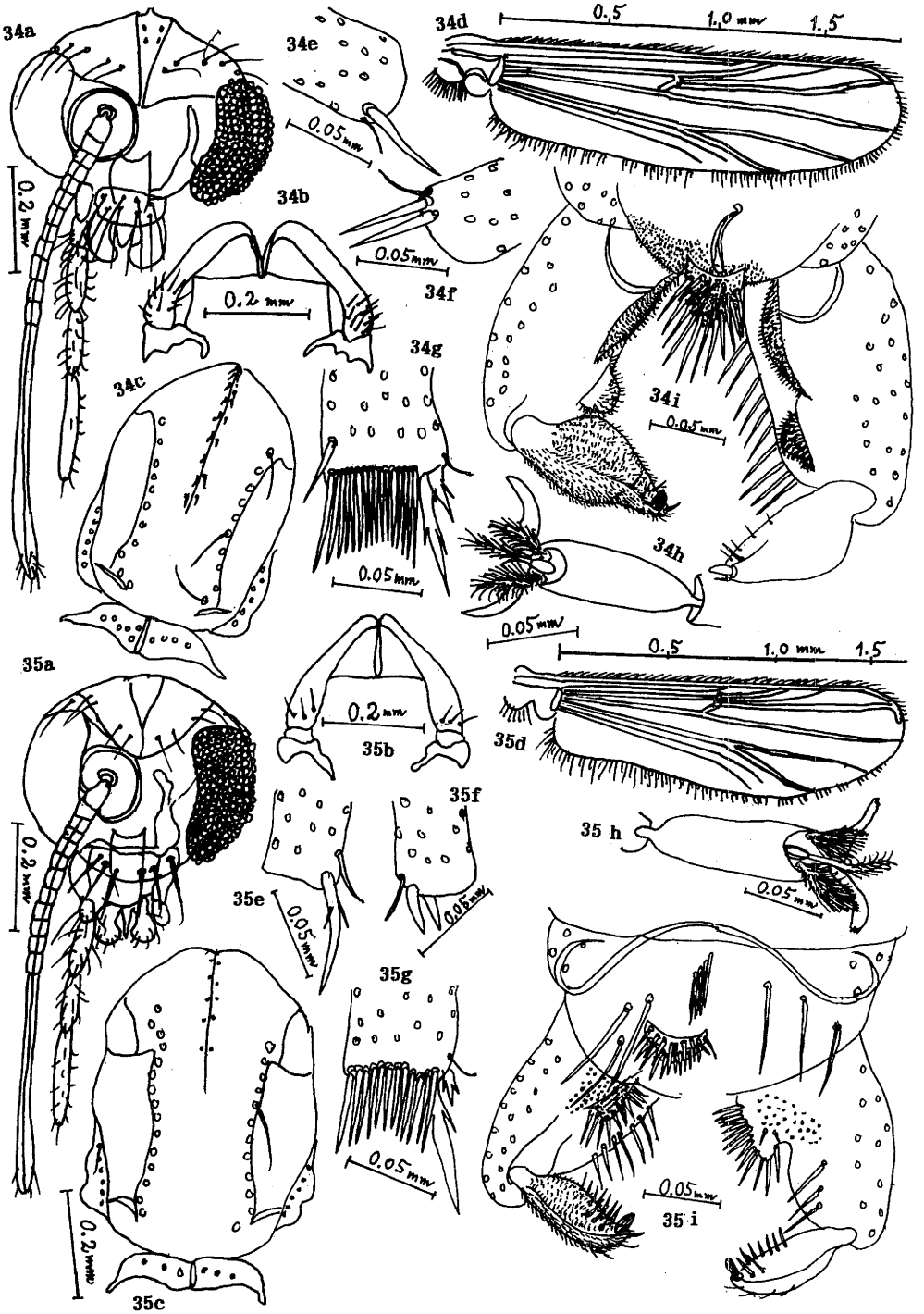

Fig. 34. *Psectrocladius yakuuveus* sp. nov.
Fig. 35. *Psectrocladius yakuveweus* sp. nov.

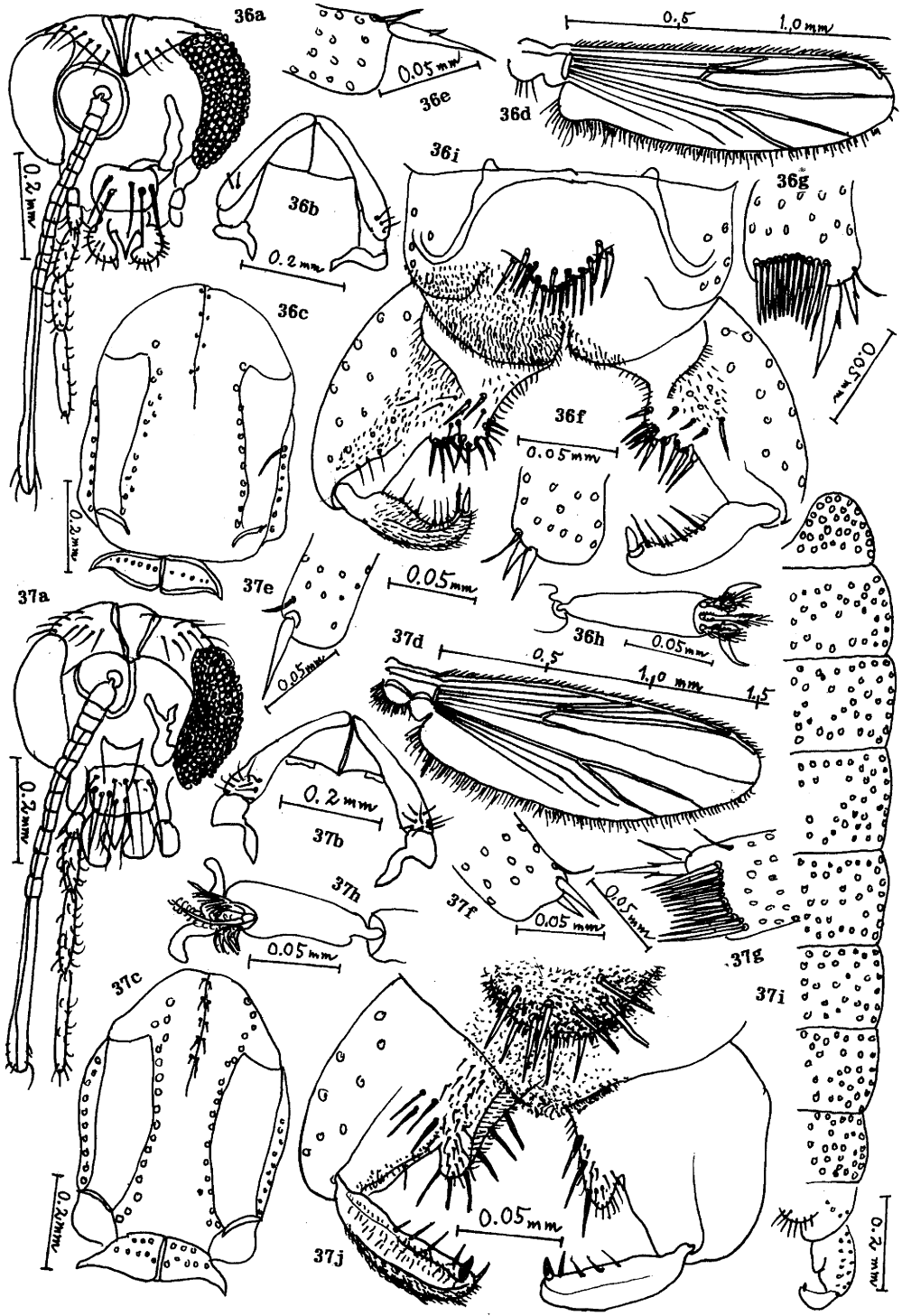

Fig. 36. *Psectrocladius yakuwexeus* sp. nov.
Fig. 37. *Psectrocladius yakuxeyeus* sp. nov.

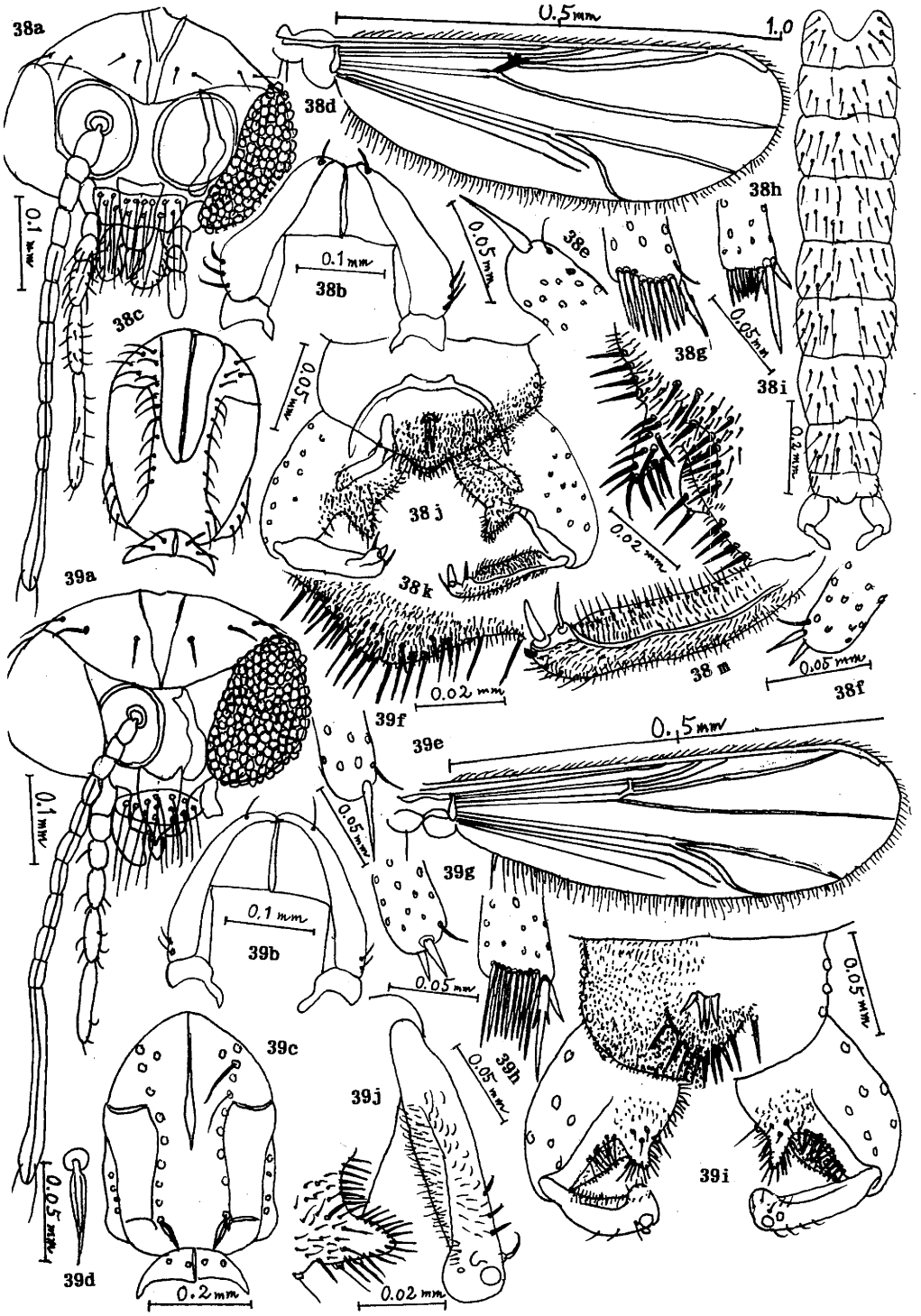

Fig. 38. *Limnophyes minimus* (Meigen, 1818)
Fig. 39. *Limnophyes yakyabeus* sp. nov.

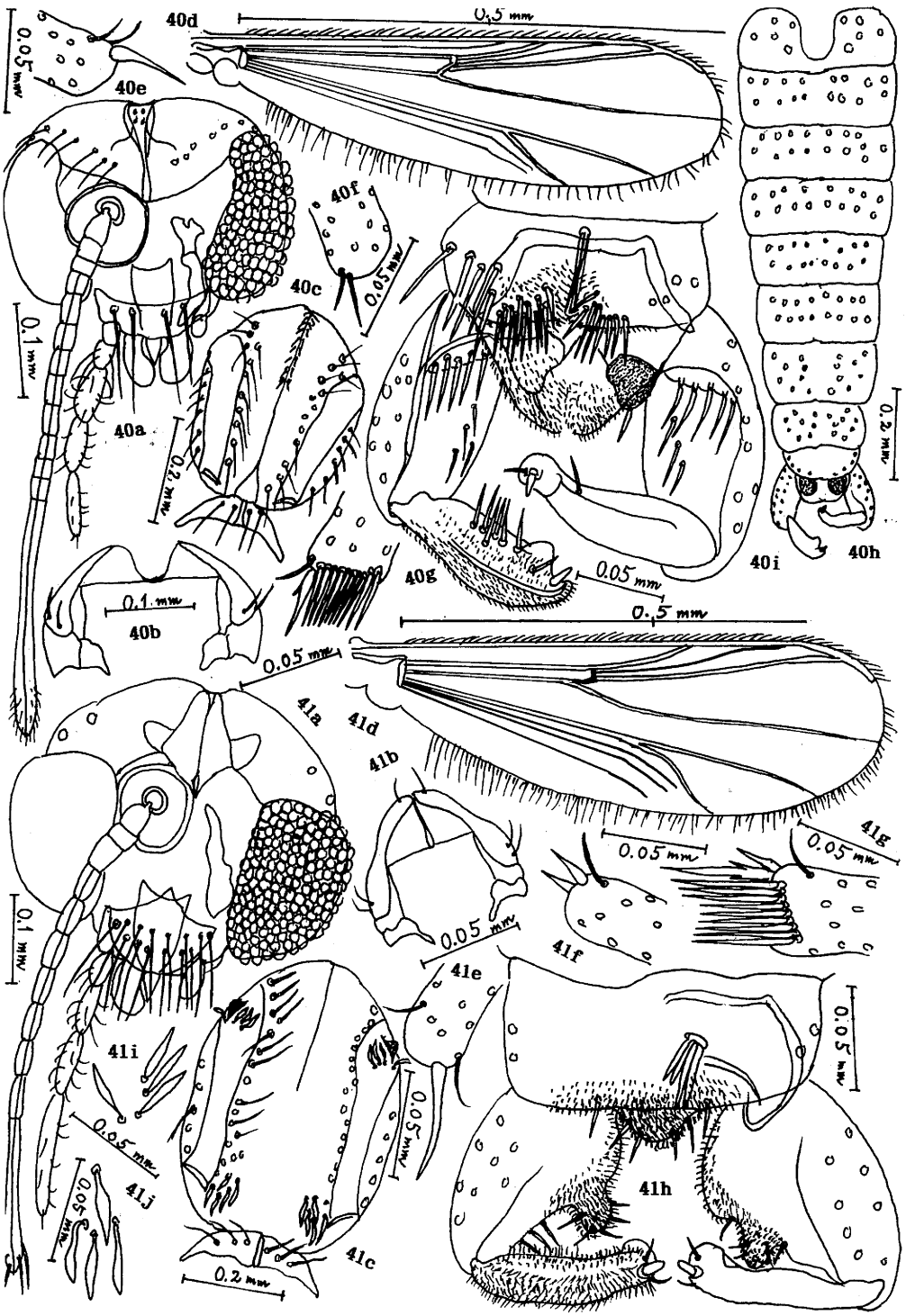

Fig. 40. *Limnophyes yakybeceus* sp. nov.
Fig. 41. *Limnophyes yakycedeus* sp. nov.

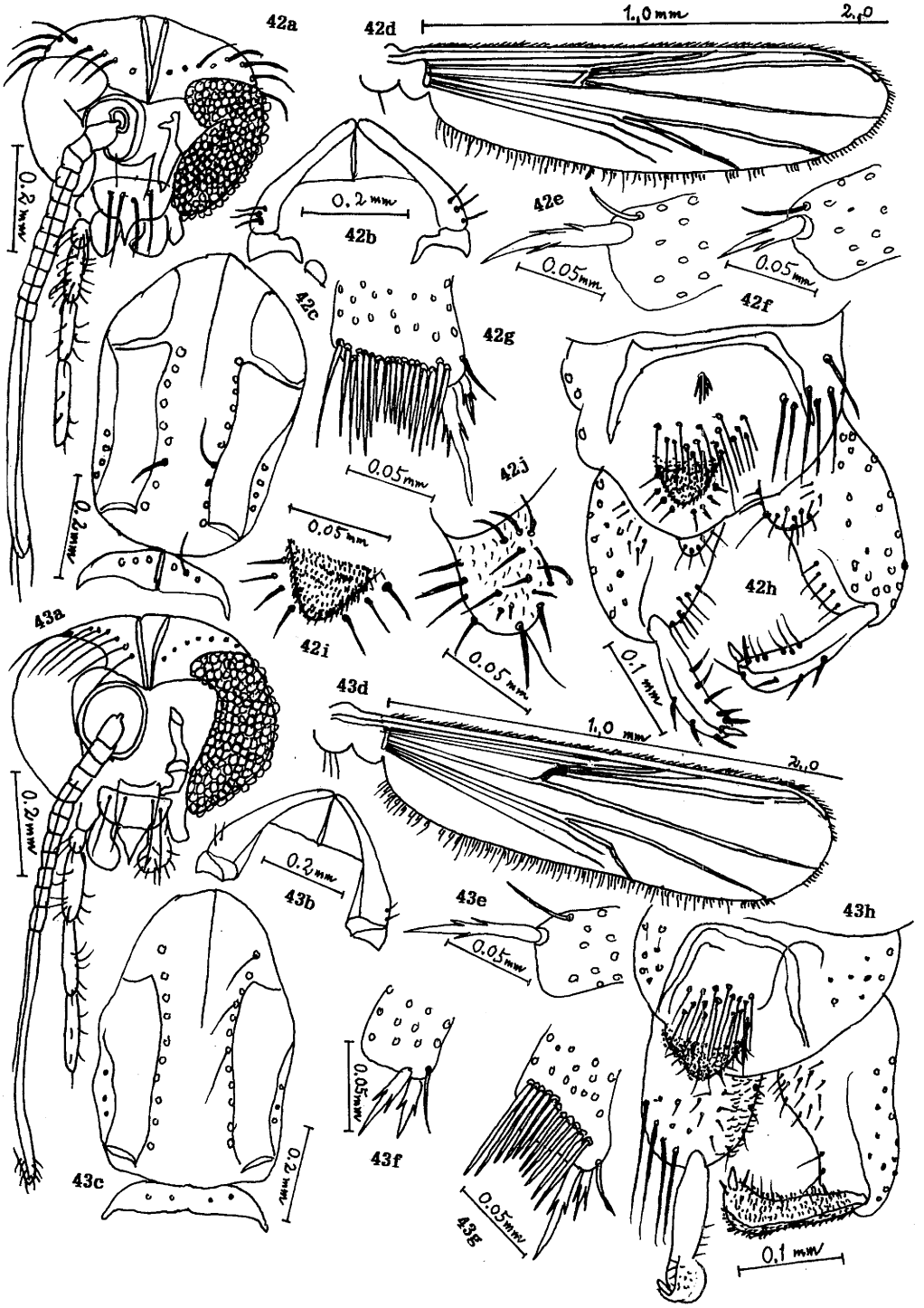

Fig. 42. *Limnophyes yakydeeus* sp. nov.
Fig. 43. *Limnophyes yakyefeus* sp. nov.

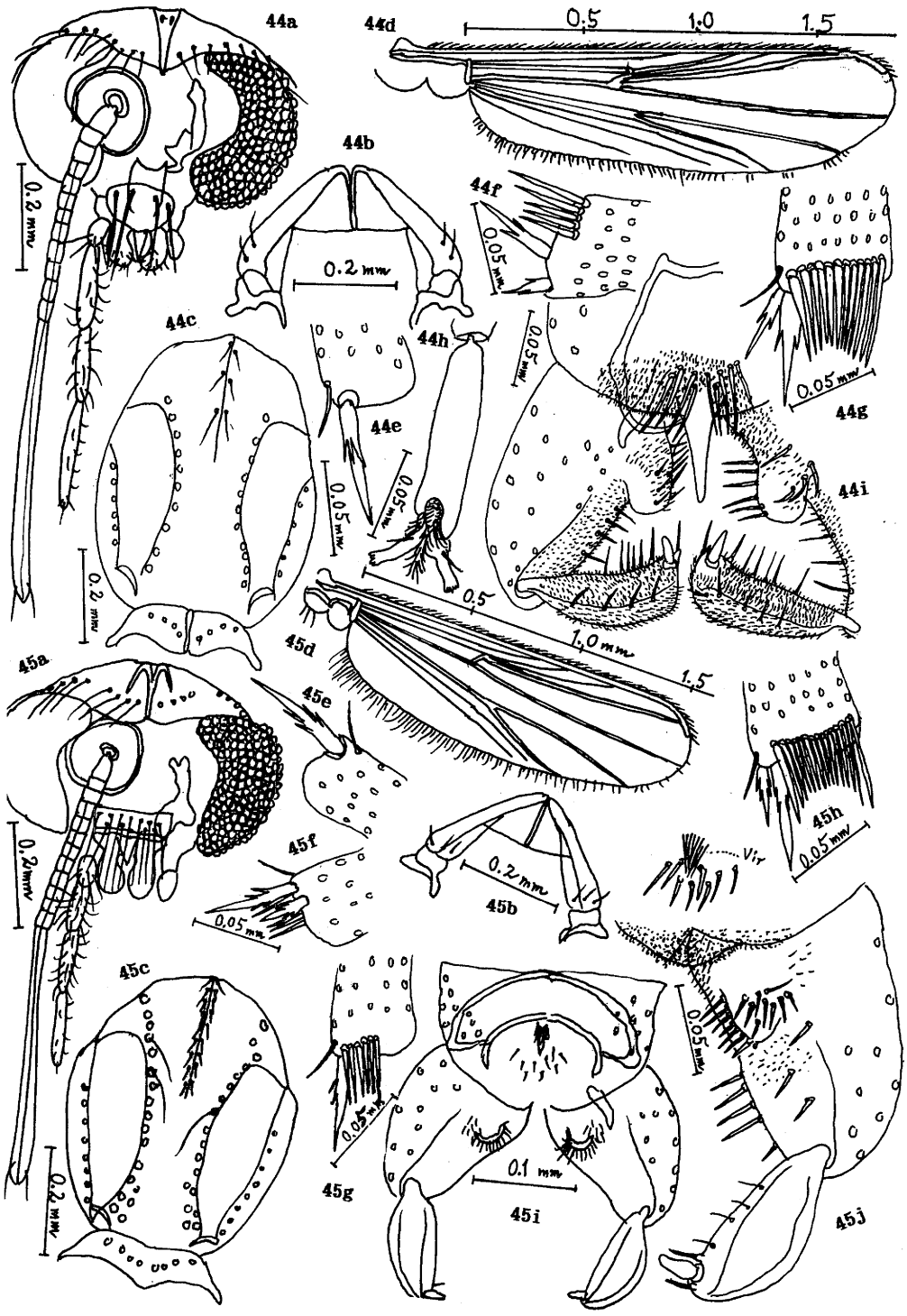

Fig. 44. *Okinawayusurika yakyfegea* sp. nov.
Fig. 45. *Okinawayusurika yakygehea* sp. nov.

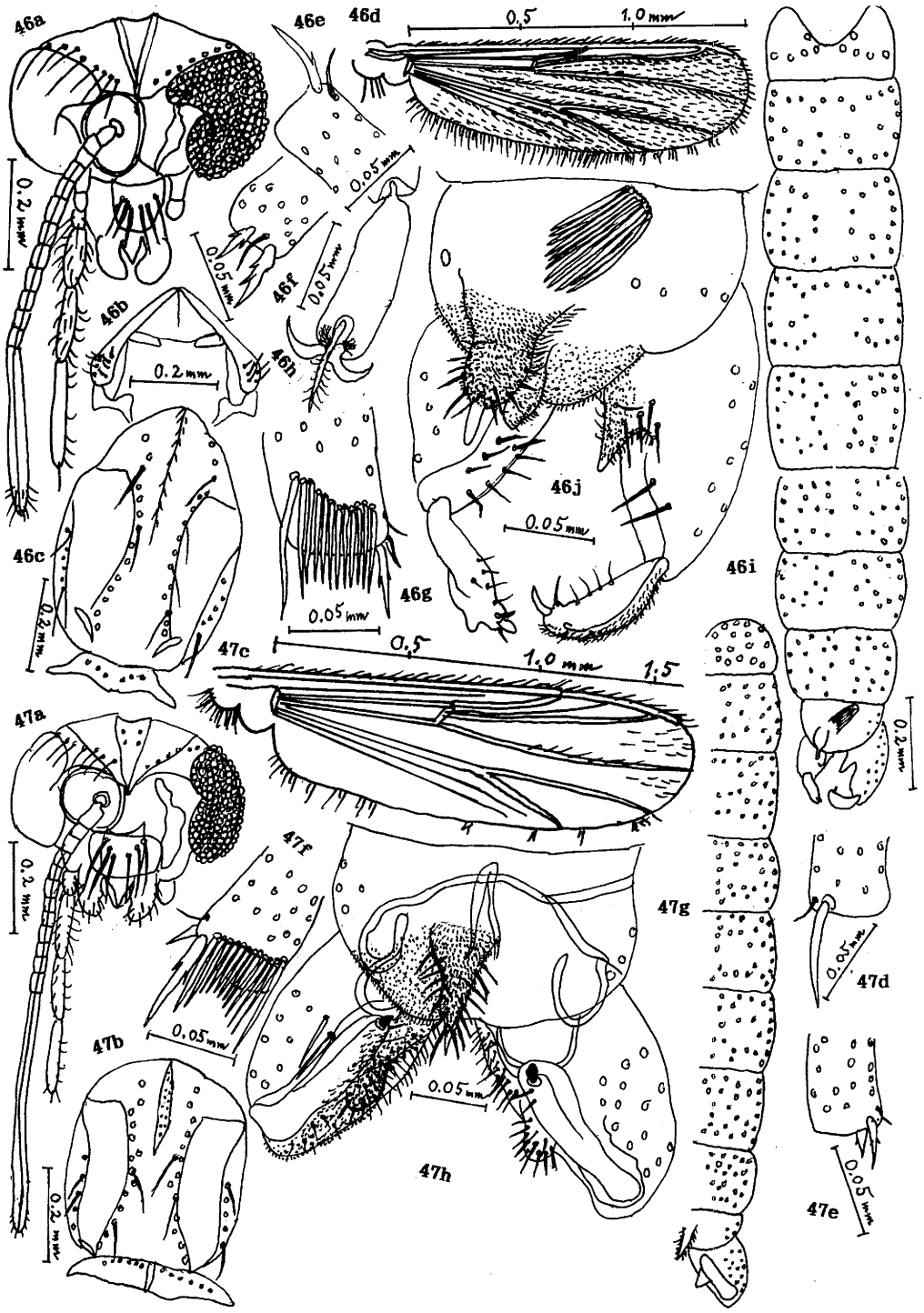

Fig. 46. *Metriocnemus yakyheius* sp. nov.
Fig. 47. *Metriocnemus yakyijeus* sp. nov.

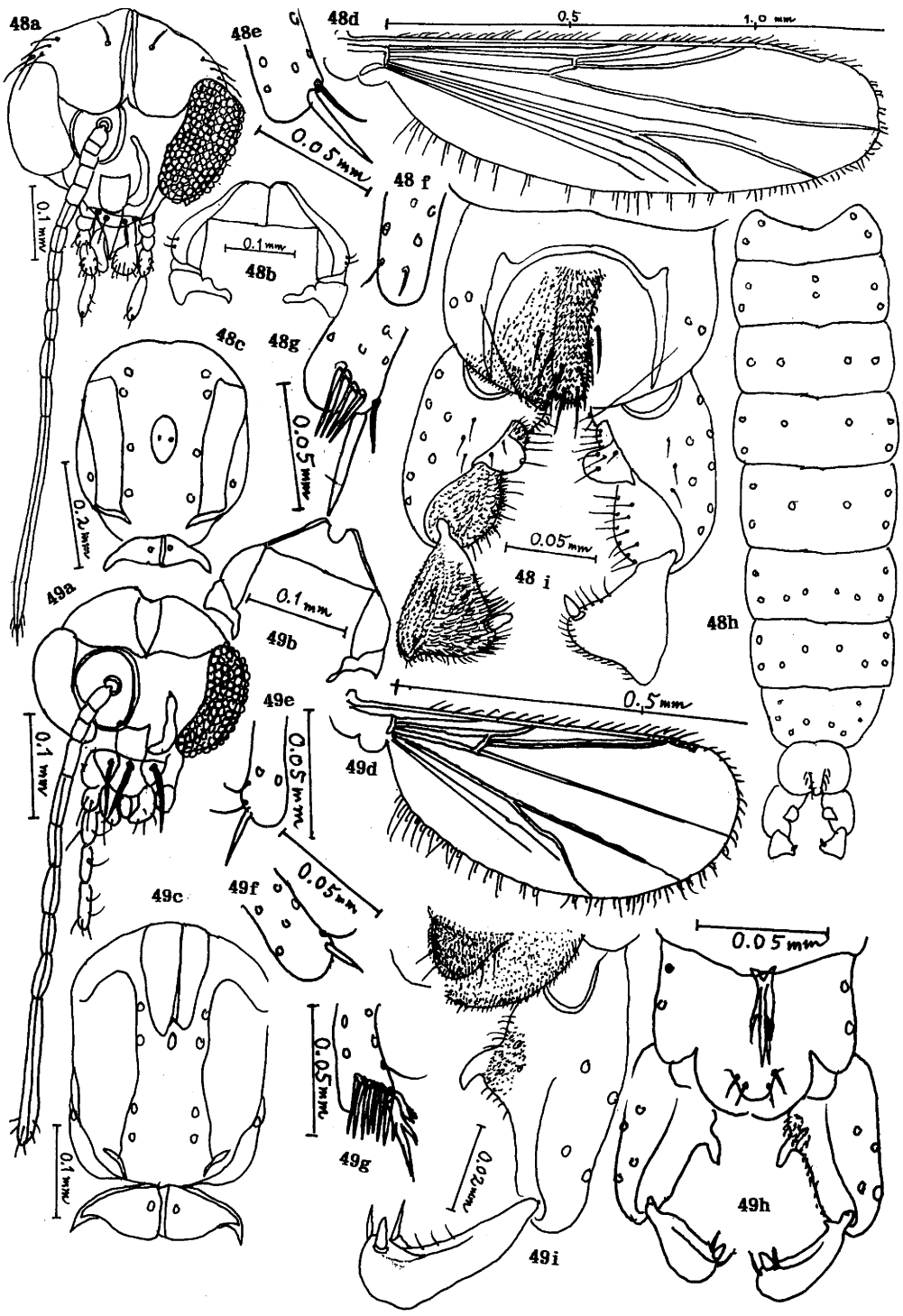

Fig. 48. *Parakiefferiella yakytriangulata* sp. nov.
Fig. 49. *Parakiefferiella yakykelea* sp. nov.

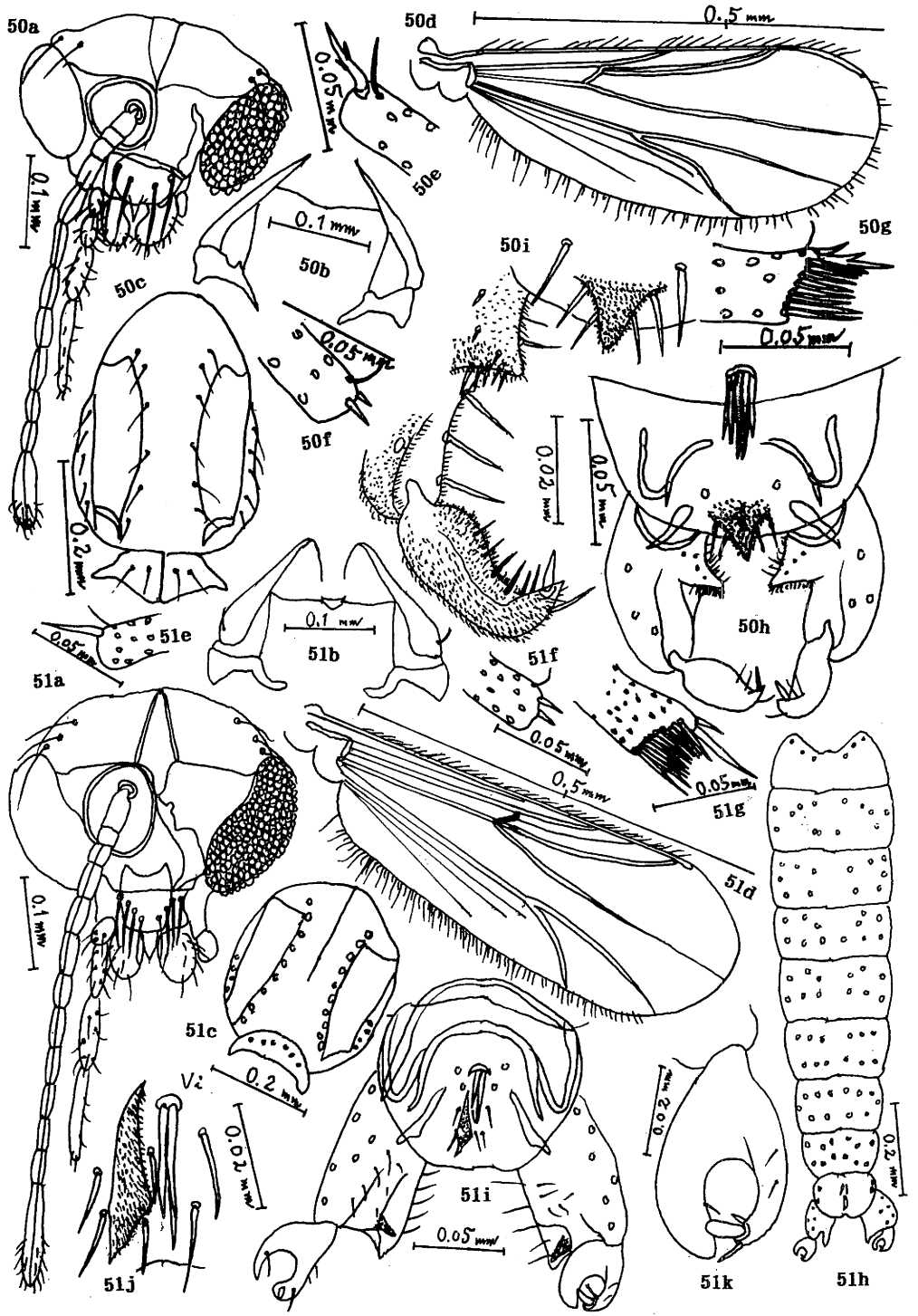

Fig. 50. *Parakiefferiella yakylemea* sp. nov.
Fig. 51. *Pseudosmittia furudobefurca* Sasa et Arakawa, 1994

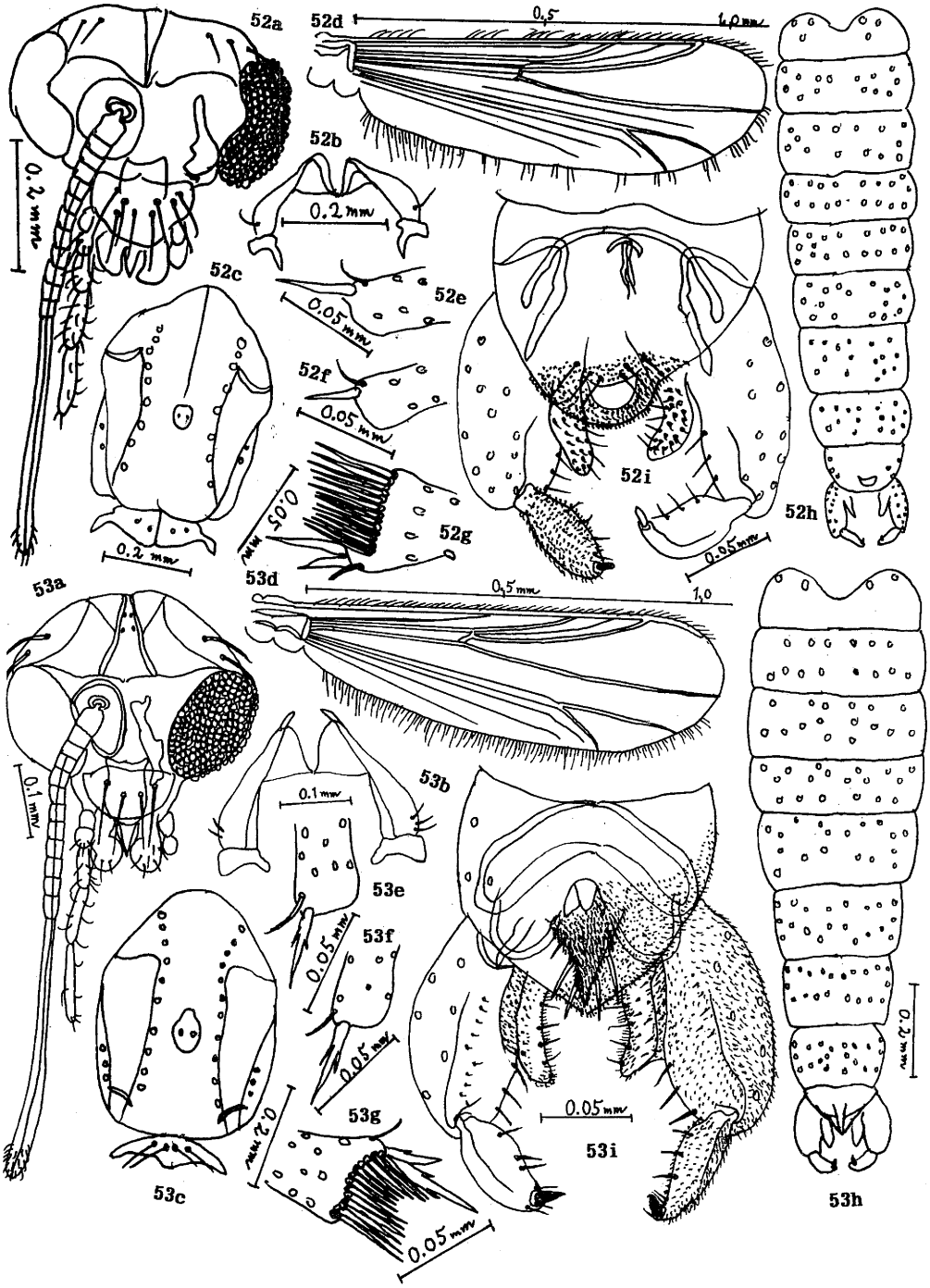

Fig. 52. *Pseudosmittia yakymenea* sp. nov.
Fig. 53. *Pseudosmittia yakyneoa* sp. nov.

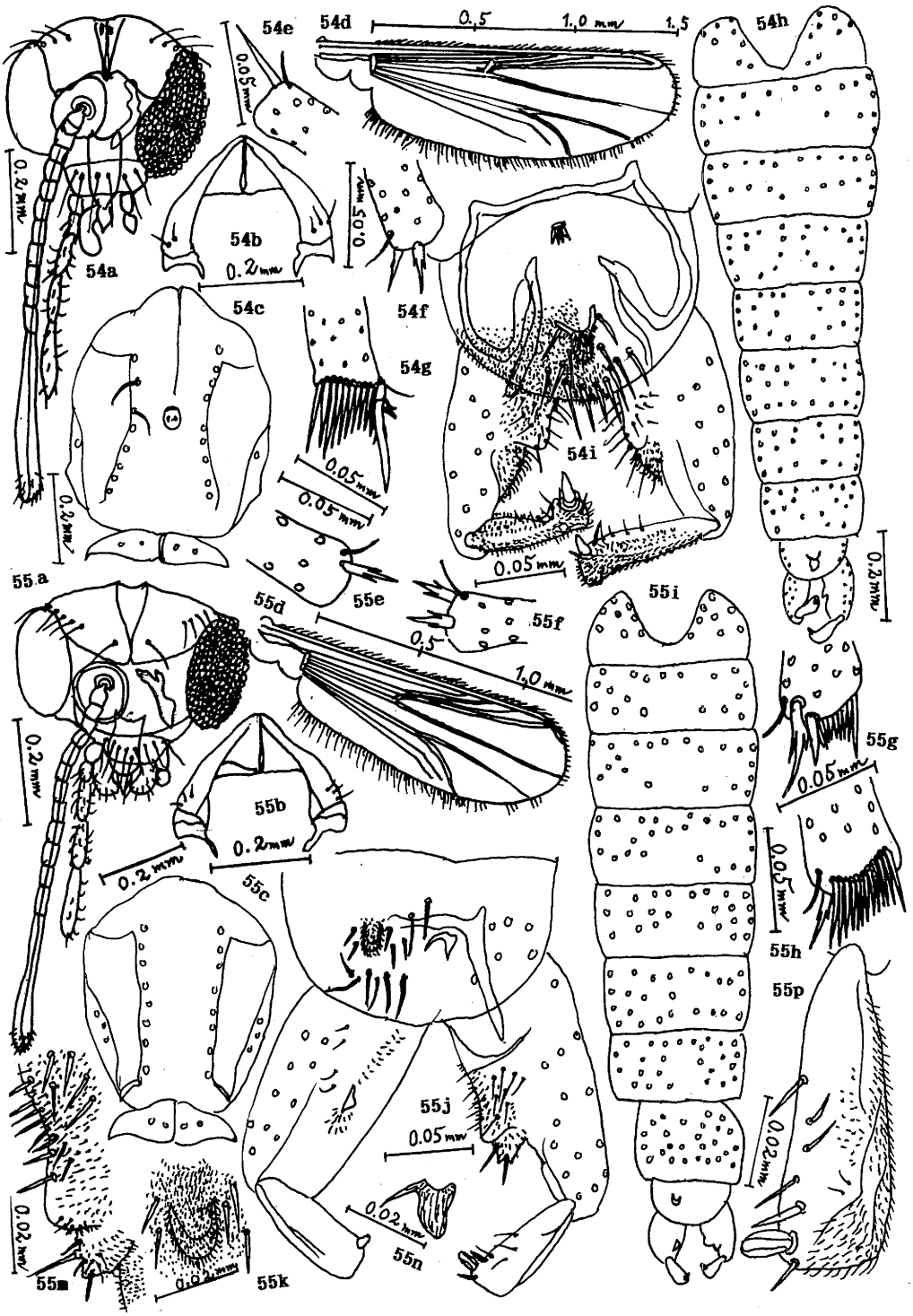

Fig. 54. *Pseudosmittia yakyopea* sp. nov.
Fig. 55. *Pseudosmittia yakypequea* sp. nov.

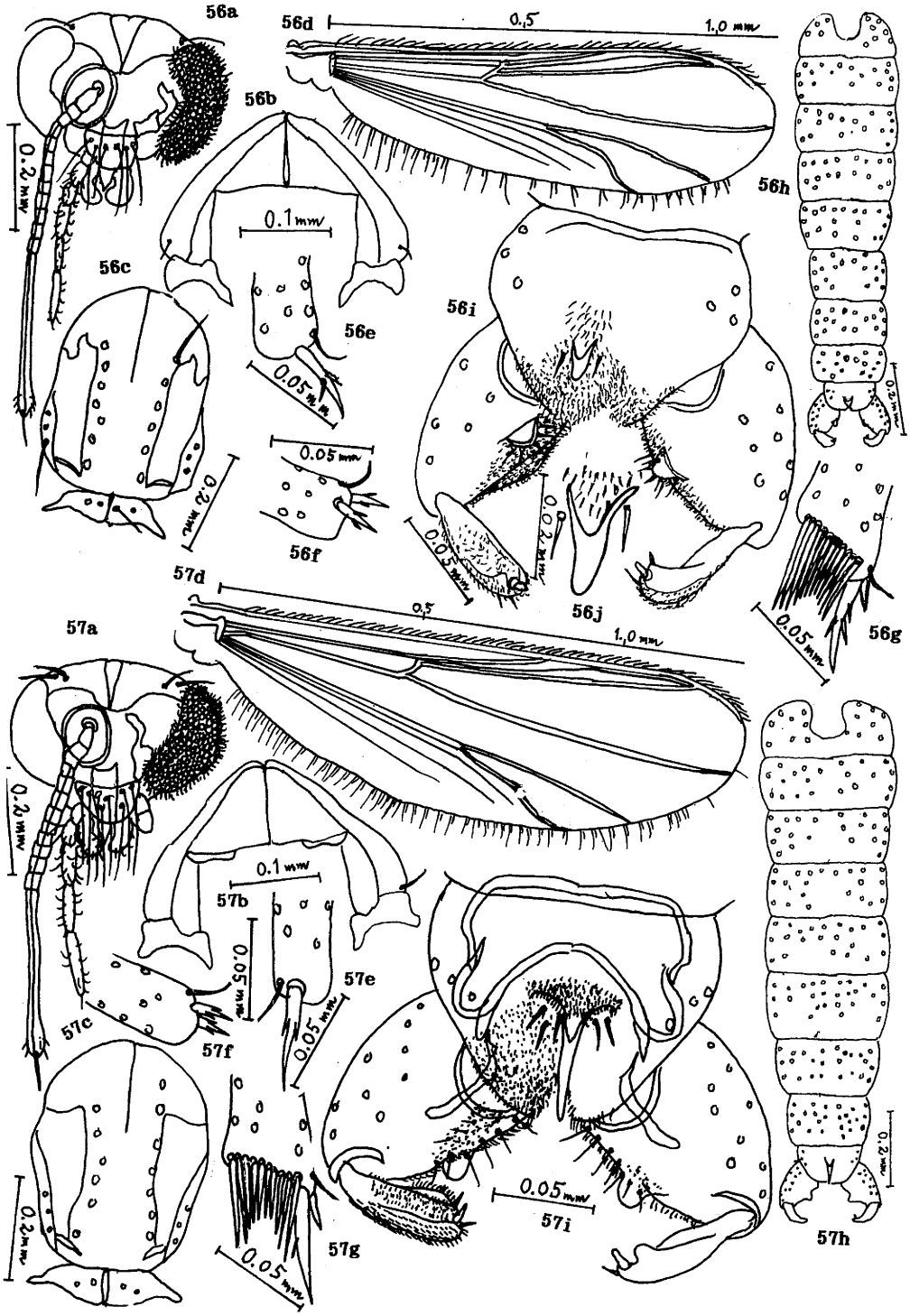

Fig. 56. *Smittia yakyquerea* sp. nov.
Fig. 57. *Smittia yakyresea* sp. nov. a-i

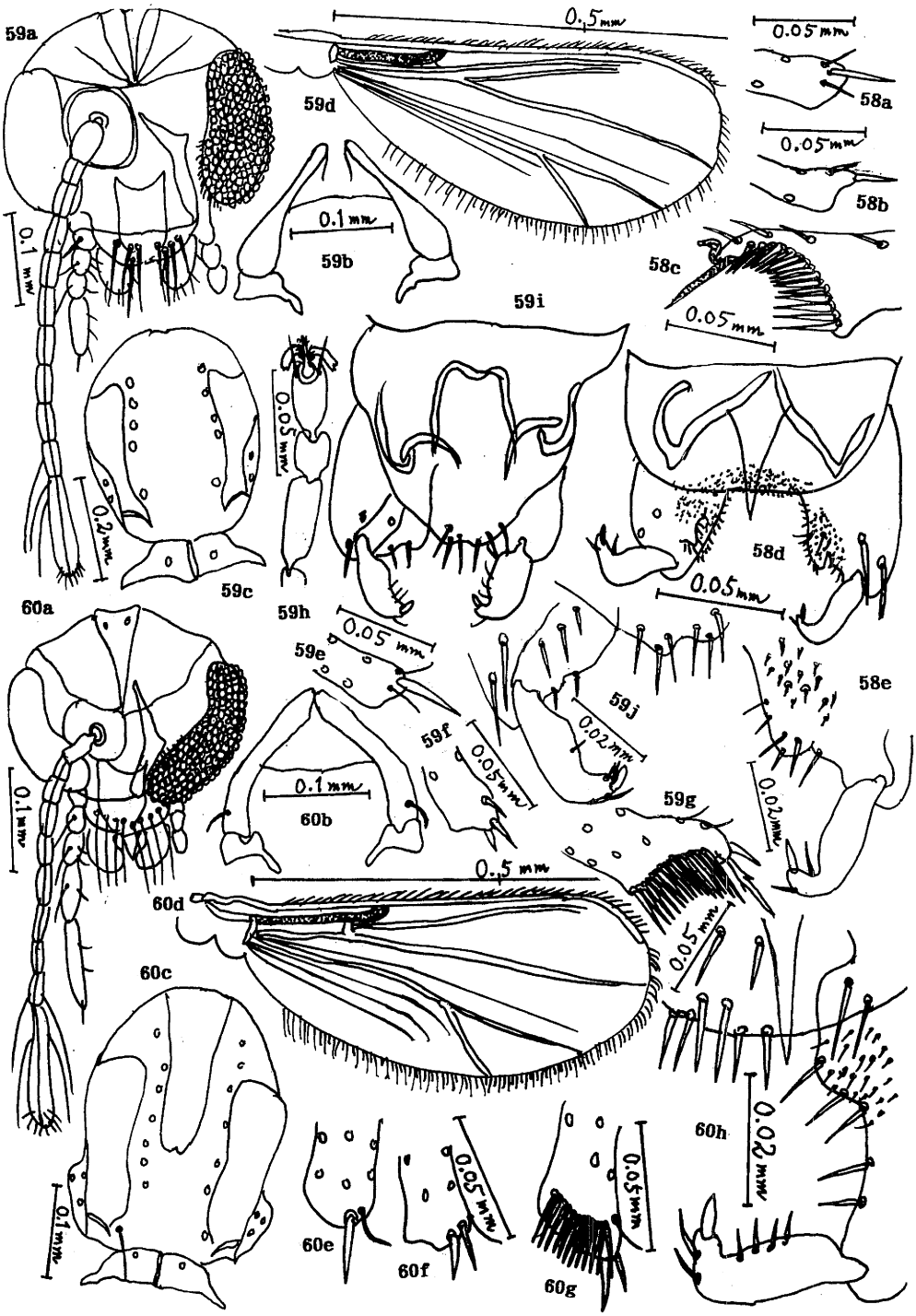

Fig. 58. *Corynoneura kibunespinosa* Sasa, 1989
Fig. 59. *Corynoneura yoshimurai* Tokunaga, 1939
Fig. 60. *Thienemanniella flaviscutella* (Tokunaga. 1936)

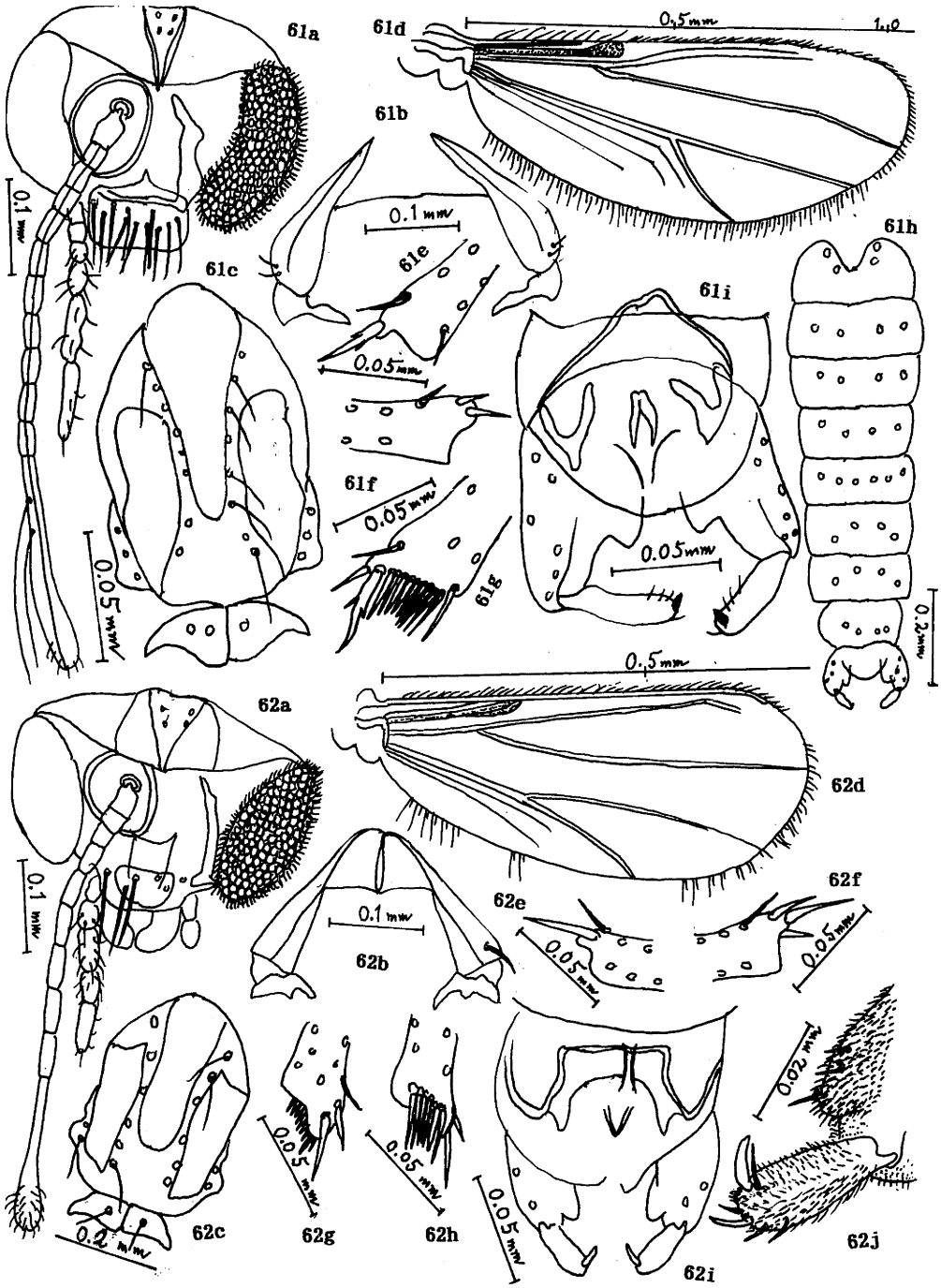

Fig. 61. *Thienemanniella vittata* (Edwards, 1924)
Fig. 62. *Thienemanniella yakysetea* sp. nov.

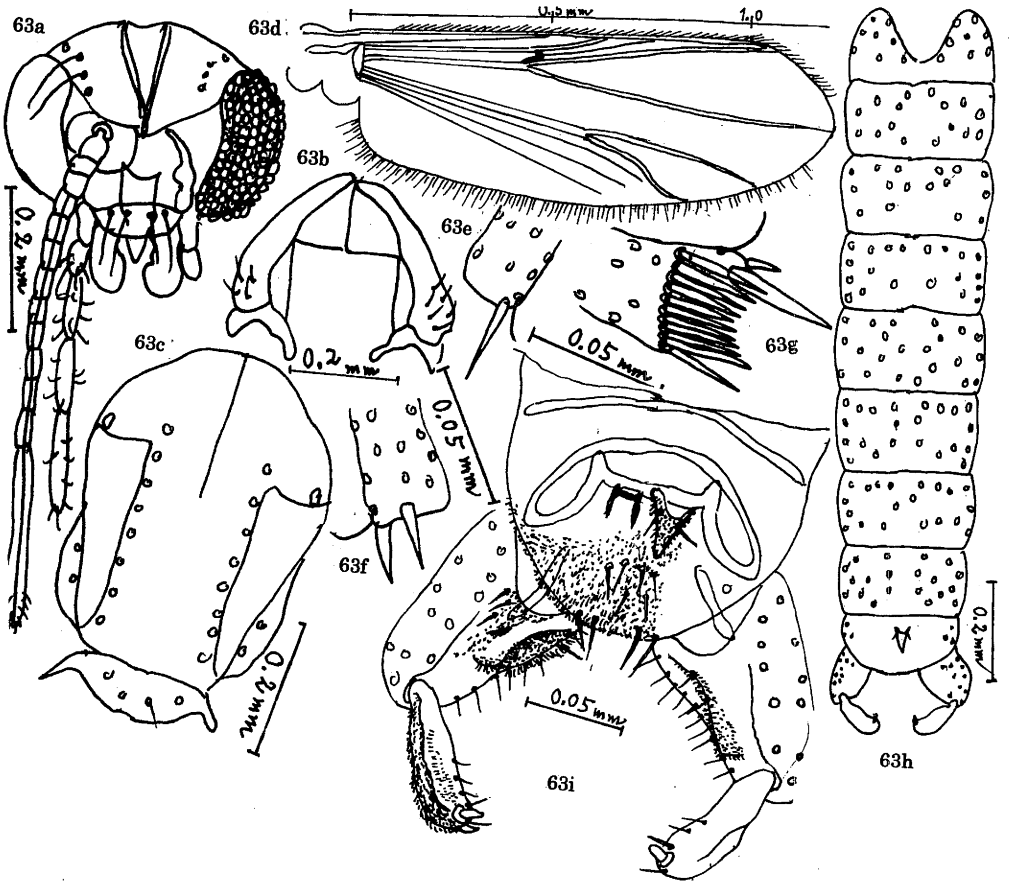

Fig. 63. *Pseudosmittia yakytaira* sp. nov.